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THE VETERINARY JOURNAL

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CONTENTS.

	PAGE
BIOGRAPHY—	
Sir Edward Brown, LL.D., F.L.S. ...	1
EDITORIALS—	
The Control of Poultry Diseases ...	2
Royal College of Veterinary Surgeons' Library Catalogue ...	3
GENERAL ARTICLES—	
Veterinarians and Poultry Husbandry. By Sir Edward Brown, LL.D., F.L.S. ...	4
The Poultry Industry in 1935. By Sir Edward Brown, LL.D., F.L.S. ...	5
Poultry Diseases. By K. D. Downham, B.V.Sc., M.R.C.V.S., D.V.H. ...	9
Observations on an Outbreak of Fowl Paralysis. By J. W. Johnston and J. E. Wilson, B.Sc., M.R.C.V.S. ...	13
Poultry Mortality. By G. Mayall, M.R.C.V.S. ...	19
Some Notes on *Lymphomatosis gallinarum*. By H. P. Hamilton, B.V.Sc. (Toronto). ...	21
Bloodtesting as a Means of Controlling Bacillary White Diarrhœa in the Irish Free State. By N. H. Spears, M.R.C.V.S. ...	26
A Preliminary Report on the Helminthic Parasites of Poultry, Wild Birds and Small Mammals in the South Wales Area. By T. Walker, B.Sc. ...	28
ABSTRACTS OF CURRENT LITERATURE ...	31
CORRESPONDENCE—	
Infectious Brown Mouth or Dry Distemper. ...	36
OBITUARY ...	37
PREPARATIONS AND APPLIANCES ...	39
PERSONAL ...	39
PLATES—	
Sir Edward Brown, LL.D., F.L.S. (*Frontispiece*).	
Some Notes on *Lymphomatosis gallinarum*. (*Article by* H. P. Hamilton, B.V.Sc.)	
The late Mr. Henry Sumner, M.R.C.V.S. (*Obituary*).	

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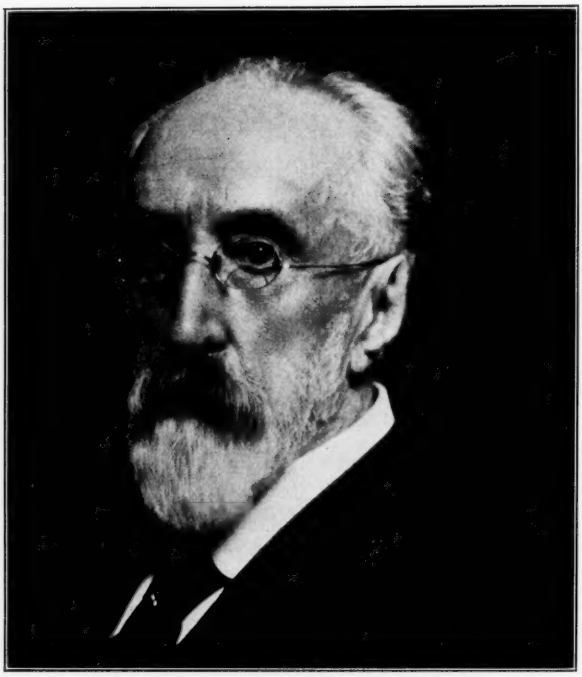

SIR EDWARD BROWN, LL.D., F.L.S.

President of the World's Poultry Science Association, 1912–1927;
Joint President of the World's Poultry Congress, 1921–1924.

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JANUARY, 1937

Biography

SIR EDWARD BROWN, LL.D., F.L.S.

THE subject of our frontispiece has probably done more than any other man to put the poultry industry in Great Britain on a scientific and prosperous basis, and we are proud to have the honour of bringing his name into prominence before the members of the veterinary profession. In these days it is well recognised that the prosperity of any branch of the animal world depends not only on preventive and curative measures which are used against disease, but equally on the maintenance of the animals in health and the care which is necessary to be taken to ensure that the animals and birds will be not only healthy, but raised from the best stock. The poultry industry has assumed such an important position amongst the livestock of the nation that it may be said to occupy a place which is literally second to none of its kind; but it is only of late years that the veterinary profession as a whole have taken serious cognisance of the fact that in the prevention and cure of disease amongst the birds of the farmyard there is work to be done which gives them a very hard and worthy foe to combat. It is not with the individual bird that they will ever be vitally concerned, but with flocks, which are large and numerous and which form the livelihood of not only the large owner, but also of the smallholder too; and it is due to the work of men like Sir Edward

Brown that the importance of the study of diseases of poultry has been brought to the notice of the profession.

Sir Edward, who is now in his eighty-sixth year, has recently written his Memoirs,* which make most fascinating reading, not only as the history of a man who made his way upwards from small beginnings with great determination, but as a history of the poultry world and poultry congresses in this and other countries.

Editorial

THE CONTROL OF POULTRY DISEASES.

It is long overdue that the members of the veterinary profession in Great Britain took their legitimate place in poultry husbandry as advisers to the flock owners on points concerning their charges when in health, as well as to give advice and apply treatment with regard to the prevention of epidemics and in the treatment of the birds when ill. Until a comparatively few years back the treatment of sick birds was almost entirely in this country in the hands of the empiric, and, as Sir Edward Brown states in a leading article, in his appeal to the profession, under the heading "Veterinarians and Poultry Husbandry," "often have those engaged in the poultry industry lamented that they could get little or no help from local veterinary surgeons," adding that the last-named evinced little interest in poultry diseases. It is true that with individual birds—and even in districts where there are numbers of small flocks—it has not been worth while financially for the local practitioner to interest himself in poultry diseases. He has neither the time to devote to the subject, nor has he in the past had the pathological knowledge imparted to him in his College course which would enable him successfully to diagnose and control epidemic outbreaks. In other countries, especially Holland, France, Germany and, indeed, most of the countries of Europe, and in America and Canada, the students of the diseases of poultry have received not only a foundation of teaching in the veterinary schools, but there has been enough to be done to enable a man to get a good livelihood by specialising in this subject after taking his veterinary degree. The article by Sir Edward Brown, who is always spoken of as the "Father of the Poultry Industry" in Great Britain, indicates throughout its paragraphs a great opening which he and other poultry breeders consider should be filled by veterinarians, especially in regard to advice concerning the hygiene of the poultry industry and prophylaxis against disease. There is no patient of the veterinarian which gives more opportunity for study of its internal parasites than the domesticated fowl and its close neighbour, the duck; and in the varieties of their diseases there is more than sufficient analogy and

* "Memoirs at Eventide." John Dixon, Ltd., Burnley, Lancs.

contrast to give human pathologists much help and much to think about when studying tumours and filter-passing virus diseases. In the past the comparative aspect of the diseases of birds and mammals has not been sufficiently utilised ; and in many instances it is still an untrodden field, which the younger generation of scientific veterinarians might follow up to the advantage of the whole world. The summary of the Poultry Industry in 1935 by Sir Edward Brown, which we have detailed in this issue, expresses fully and concisely the enormous amount at stake in this country ; and it is amazing to read, taking one quotation alone, that in comparison, " eggs and poultry were greater than wheat by £18,204,278 ; than oats by £16,194,736 ; and than barley by £19,697,053." Surely when we read these figures it behoves one to think of the field which is open to the British veterinarian, a field which he has only, and that not until comparatively recent years, just entered.

ROYAL COLLEGE OF VETERINARY SURGEONS' LIBRARY CATALOGUE.

We beg to draw the attention of our readers to the fact that the valuable and unique collection of veterinary volumes—the most complete of its kind in the British Empire—has now (thanks to the supervising energy of the Librarian, Dr. Fred Bullock, LL.D., and his assistant, Miss Sheather) been catalogued; so that intending borrowers can now know exactly what books of reference can be obtained. The price of the Catalogue is only one shilling, and this useful little volume should be on the writing-desk of every Member whose name is on the Register of the Royal College of Veterinary Surgeons. Further particulars can be obtained from the Librarian, 10, Red Lion Square, London, W.C., upon request.

General Articles

VETERINARIANS AND POULTRY HUSBANDRY.

By SIR EDWARD BROWN, LL.D., F.L.S.

Consultant, National Poultry Council, and first President World's Poultry Science Association; and President of the World's Poultry Congresses, 1921–1927.

DURING the sixty years of my association with the breeding and extension of domestic poultry, first on the exhibition side, and later in what is the food aspect, the lack of study by veterinary surgeons of poultry diseases has been very apparent. I can only remember one active member of the profession who was a breeder of poultry on a commercial scale. Strange to record, that when disease attacked his flock, he sought my advice—that of a layman. Often have those engaged in the poultry industry lamented that they could obtain little or no help from local veterinarians, and that the last-named evinced little interest in poultry diseases. Such was not the case to the same degree in some other countries, instances of which were found in France, where the Government enabled the late Louis Pasteur to study a widespread epidemic among French poultry; and in the United States, where special investigations were instituted in several poultry diseases, of which blackhead in turkeys was one. These were, however, limited and centralised, and to what extent poultry disease has been an integral part of the training of veterinary surgeons in any country I do not know.

The reasons for the position here stated have been largely financial, and on this account there has been little evidence of desire for co-operation. Poultry individually are of small value. Poultry farmers, therefore, have not found it to be worth their while to pay fees which would justify qualified veterinary graduates to specialise during and after their period of training, as in the case of the larger animal farm stock. With the vast increase in numbers of poultry we have now attained the position wherein poultry farmers regard the question differently, and are prepared to engage the services of disease experts where these are available. Of that there has been considerable evidence in recent years. Where there are a thousand head of poultry on a farm the question is not the individual, but the flock value. There has been some definite progress in this direction, but it is still limited. It is not, however, only that knowledge of disease and how to cure it, is necessary, but how to secure prevention. A prime necessity is that advisers shall understand and take an interest in poultry as such, keeping constantly in view the contributory factors. These include selection for health and vigour, the limitations of individual egg production, a protective environment, methods of control inclusive of feeding; and, in short, a knowledge of poultry breeding and production in all its aspects.

XUM

What is here stated has at last been recognised, namely, that the great menace to prosperity in poultry husbandry is that of disease. This has been emphasised by the appointment of a Committee charged to inquire into the subject. It may be hoped that as a result poultrymen will recognise the primary importance of preventive measures, and that veterinarians will realise that conditions have changed throughout the country, and that there are great opportunities for research if they are prepared to qualify themselves.

The above are thoughts on a question of great national importance. The production of eggs and poultry in Great Britain in 1936 is estimated to have been £30,000,000, and it is capable of great extension. Mortality would appear to be from fifteen to eighteen per cent., and in some districts more. Even if only working out at three per cent. of the total value, it means more than £3,000,000 per annum, and in some parts of the country the loss is much greater. These facts are commended to the consideration of your readers.

THE POULTRY INDUSTRY IN 1935.

By SIR EDWARD BROWN, LL.D., F.L.S.

Consultant, National Poultry Council.

In my review of the poultry industry for 1934, I reported a check to that increase in our poultry population which had characterised each year since 1919. In 1933 adult fowls and ducks exceeded those of 1932 in England and Wales by 7.1 per cent., in Scotland by 7.3 per cent., and Northern Ireland by 4 per cent.; but in 1934 such increases had dropped to 1.5 per cent. in England and Wales, and in Scotland to 2.2 per cent.

The census on June 4th, 1935, showed that poultry on holdings of an acre and upwards in England were fewer than in 1934 by 5 per cent., and in Wales by 3 per cent. In Scotland, however, the pace of increase, whilst slowed down, was 2.6 per cent. above 1934. In only two English and one Welsh county was an increase recorded. The figures for Northern Ireland are not given, since the census is taken there on all holdings of a quarter of an acre and upwards, and hence not comparable with the figures for Britain.

A year ago a decrease was anticipated, as there had been in 1934 a marked reduction in the number of chickens reared, and that is also true for 1935. Whilst geese and turkeys were almost static, the 1935 census records that of fowls and ducks under six months old in England and Wales there had been a further reduction of 5.1 per cent., and in Scotland of 7.9 per cent. We may consequently expect a decreased supply of home-produced eggs and poultry during 1936.

Cereal Crops and Poultry Production.

By courtesy of the Agricultural Departments I am able to give estimates as to the value of cereal crops in Britain, and compare these with those of poultry production, which are based on estimates of holdings of an acre and upwards,

and on computations of smaller occupations. Owing to the small output of wheat and barley grown in Northern Ireland, oats being an exception, that part of the kingdom is not included. No returns are available of eggs sold for hatching or of birds sold as breeding or laying stock, but the extent of this trade is a large and important factor.

ESTIMATED PRODUCTION VALUES OF EGGS AND POULTRY, 1935.

	£
England and Wales	24,060,186
Scotland	3,028,300
Total	£27,088,486

ESTIMATED TOTAL VALUES OF CEREAL CROPS, 1935.

	Wheat.	Oats.	Barley.
	£	£	£
England and Wales ...	8,209,675	6,013,250	6,922,833
Scotland	674,333	4,880,500	468,600
Totals	£8,884,008	£10,893,750	£7,391,433

The total, therefore, of all cereal crops in Great Britain in 1935 was £27,169,191, which was a slight increase over the previous year, due to increased production of oats both north and south of the Border.

In a comparison of egg and poultry production with cereal crops in Great Britain during 1935, my estimate, as shown above, inclusive of those from small occupations, urban and rural, is that cereals were greater in total value by £80,705, or 0.3 per cent. Eggs and poultry were greater than wheat by £18,204,478, or 205 per cent. ; than oats by £16,194,736, or 182.3 per cent. ; and than barley by £19,697,053, or 221.7 per cent.

In this connection there are two considerations : the subsidising of wheat crops in the one direction, and the decline of number of poultry, both adult and young, by nearly 5 per cent. in Great Britain with only a small increase in market values. If the corresponding figures for Northern Ireland were included, the excess, as for several years, would be on the side of eggs and poultry.

General Observations.

Except for higher prices for home-produced eggs in the latter half of 1935, it cannot be claimed that the difficulties of poultry farmers are yet solved. Whether these improved prices can be maintained depends largely on how far producers realise their responsibility for quality both of eggs and table poultry. Numbers are important, but flooding the markets with poor quality eggs and scraggy chickens checks consumption.

Uncertainty as to the future in respect to marketing has undoubtedly checked production, especially as regards the smaller producers who sell direct to consumers and retailers, and feel threatened by the extensive powers which would be conceded to Marketing Boards under the Commission's Report.

In previous surveys attention has been drawn to the serious loss caused by disease and its effect on the prosperity of the poultry industry. It is, therefore,

XUM

satisfactory that the Ministry of Agriculture has appointed a committee to inquire exhaustively into the whole question, since the losses through mortality must extend to several million pounds per annum.

The figures given below as to imports speak for themselves. It is apparent that quotas have not yet accomplished their object, nor have tariffs. What will be the effect of further proposals can only be proved by experience.

One disconcerting fact is that a number of poultry-keepers, especially newcomers, appears to be again plunging into several novel methods which are abnormal in the extreme, in the fond hope that these will be short cuts to success, and when trouble arises they resort to nostrums in the hope of cure, instead of seeking for prevention. New ideas are essential to meet new conditions, but these must conform to the limitations which nature imposes.

Egg Imports.

In the following table are given the figures from the Trade and Navigation Returns published by the Board of Trade for the two years 1934 and 1935, showing the quantities of eggs imported from the countries enumerated. As usual, I have worked out from these the percentages of increase or decrease in 1935, as compared with the previous year.

It will be seen that egg imports increased by 5.5 per cent., or 1,044,555 great hundreds, upwards of 125 millions. The most striking increases last year were from South Africa, the Netherlands, Belgium other foreign countries, and decreases from the Irish Free State, Australia, and other British countries, Finland and China. Whilst I do not intend these annual summaries to deal with commercial or political aspects, the abnormally large increases from Belgium and the Netherlands require some explanation.

QUANTITIES OF EGGS IN SHELL IMPORTED INTO GREAT BRITAIN AND NORTHERN IRELAND, 1934 AND 1935.

Country of origin.	Great hundreds. 1934	1935	Percentages inc. or dec. 1935 from 1934
Irish Free State	3,194,394	2,395,351	25.0 dec.
Union of South Africa	300,262	360,901	20.2 inc.
Australia	2,098,943	1,921,198	8.4 dec.
Other British countries	209,831	145,013	30.9 dec.
Finland	889,461	641,517	27.8 dec.
Sweden	257,805	272,592	5.7 inc.
Denmark	6,383,211	6,563,130	2.8 inc.
Poland	1,941,836	2,014,888	3.7 inc.
Germany	72,635	not stated	—
Netherlands	944,166	2,678,970	183.3 inc.
Belgium	49,421	254,601	419.5 inc.
China	1,415,019	1,226,085	13.3 dec.
Other foreign countries	1,050,260	1,303,518	24.1 inc.
Totals	18,734,209	19,778,764	5.5 inc.

It is of interest to note that the decline in the quantities of eggs in shell imported in 1935 as compared with 1930 was 6,782,150 gt. hds., or 25.5 per cent., and the reduction in total values was £8,614,066, or 52.5 per cent.

TOTAL VALUES OF EGGS IMPORTED IN SHELL 1935, AND AVERAGE VALUES 1934 AND 1935.

Country of Origin.	Total values 1935 £	Values 1934 per great hundred s. d.	Values 1935 per great hundred s. d.
Irish Free State	711,337	5 7	5 10¾
Union of South Africa	213,704	11 10	11 10
Australia	1,092,220	11 3¾	11 4¼
Other British countries	80,951	10 6¾	11 2
Finland	252,112	5 9½	7 10½
Sweden	105,307	8 5¾	7 8¾
Denmark	2,689,194	7 7¾	8 2¼
Poland	570,634	5 5½	5 8
Netherlands	1,001,991	8 1¼	7 5½
Belgium	120,495	6 0	9 5½
China	470,706	7 7½	7 8
Other foreign countries	468,015	7 0	7 2
Totals	7,776,699	7 6¼	7 10½

The increase in total values of eggs in shell imported over 1934 was £704,782, or 9.9 per cent., and the increase in average values was 4½*d.* per "great hundred."

Eggs Not in Shell.

As will be seen by the table given below, showing the returns for the last four years, there was a slight reduction in the volume of imports in 1935 as compared with 1934, but much above 1932 and 1933. The average values per cwt. were a little more than in 1934. As heretofore, the bulk of the supplies were received from China.

Year	Quantities. Cwt.	Values £	Per cwt. s. d.
1932	772,516	2,618,928	67 9
1933	619,905	1,578,735	58 6
1934	817,909	1,697,669	40 11
1935	792,870	1,672,263	42 2

Each year, however, there is a re-export of eggs not in shell which reduces the above total. Last year these were 24,994 cwt., in value £64,260, a fraction over 3 per cent. above the volume of this class imports.

Imports and Exports of Dead Poultry in 1935.

The returns do not separate live poultry imported from game, and there is no means of knowing what the figures are, but it may be assumed the numbers and values are small. Formerly there were given returns of re-exports of imported dead poultry. Such information is omitted, and it is reasonable to assume that the trade has decreased and has no bearing on these figures.

Country of origin.	Quantities Cwt.	Values £
Irish Free State...	105,054	419,035
Other British countries	27,963	145,597
Soviet Union	13,974	71,293
Netherlands	7,223	31,291
France	2,234	12,300
Austria	3,892	15,532
Yugoslavia	72,820	268,806
Hungary...	118,696	455,235
Other foreign countries	70,415	268,137
Totals	422,271	£1,687,226

The quantity of dead poultry imported in 1935 was less in volume than in 1934 by 29,922 cwt., or 6.6 per cent., and greater in value by £73,850, or 14.5 per cent.

NET VALUES OF IMPORTS, 1935.

Eggs in shell	£7,776,699
Eggs not in shell	1,672,263
Dead poultry	1,687,226
Total	£11,136,188

It is of interest to note that the value of total imports in 1930 amounted to £22,483,304, and dropped in 1935 to rather more than half that amount, in which decline lower average prices account for a considerable amount. My estimate as to total production and consumption of eggs and poultry in Great Britain, inclusive of imports, is as follows :

Home production	£27,088,486
Imports of eggs and poultry, inclusive of eggs not in shell ...	11,136,188
Total wholesale consumption values	£38,22,4674

Of the total value as stated 71 per cent. represent home production and 29 per cent. from Empire and foreign countries.

January, 1936.

POULTRY DISEASES

By K. D. DOWNHAM, B.V.Sc., M.R.C.V.S., D.V.H.

Veterinary Department, Harper Adams Agricultural College, Shropshire.

THE question of the control of poultry diseases is not only of vital importance to the poultry industry, but it is also a national problem. It has been shown that about £4,000,000 worth of poultry are lost annually on account of disease, and the loss due to diminished egg production and in the production of birds sold for food cannot be estimated, but is obviously enormous.

There can be little doubt from available figures that the death-rate is increasing year by year, and it is amazing that greater efforts have not been made to prevent these losses, and to assist the poultry industry to maintain healthy flocks. Poultry keeping has grown quickly, and abundance of advice has been offered from many sources in connection with feeding, management and housing of poultry, but the education of the poultry raiser upon the question of health and disease prevention has not received the support it deserves. The veterinary poultry disease worker has not been encouraged to give to the industry the help it needs upon these essential matters of health, and the amount of public money allocated to veterinary work upon poultry diseases has been ridiculously small. Certain systems of breeding, rearing, feeding and management of poultry which are antagonistic to the maintenance of healthy stock have been advocated and practised on many poultry farms, with the result that preventable diseases are now the cause of very

serious losses to poultry keepers. The time is long overdue for concerted action in connection with eradication of disease from our poultry flocks.

Health questions are the most important of all the problems of the poultry industry, and the only hope of sound propaganda upon health can come from men who have been specially trained in this subject. Public health is rightly under the control of trained medical officers, and animal and poultry health should obviously be under the control of specially trained veterinary officers. It is to be hoped that before long the veterinary poultry disease worker will be given his rightful place in the poultry industry and be consulted upon all the various matters which concern this important branch of agriculture.

Fowl Paralysis.

This condition in fowls is a good example of the results of ignoring health factors in connection with the breeding, management and feeding of poultry. The name fowl paralysis is descriptive of symptoms that are exhibited by birds which may be suffering from several conditions, in all of which paralysis may be manifested.

The group of diseases which are loosely referred to by the poultry industry as fowl paralysis may result from a diseased condition of the blood-forming organs, brought about by the management of the parent breeding stock and the affected birds up to the time the symptoms of the disease are shown. For example, eggs from birds which have good laying records are selected for hatching in the winter months. The breeding stock, at the time of selection of the breeding pens, may appear to be good birds, but in many cases they have been fed artificially upon dry mash which has been offered to them continuously in hoppers placed inside the houses, and they have matured early. At the outset the eggs are deficient in essential substances which are necessary to disease resistance because an adequate supply of fresh green food has been absent from their rations in the winter months, and the amount of sunlight, which is small during these months, has been further reduced by the fact that the birds have been encouraged to remain indoors. Green food, sunlight and fresh air are not available for the growing chicks in an adequate amount during their early days under present conditions of chick rearing.

The chickens are frequently put out on ground which already contains numbers of infective coccidial cysts and worm eggs, and sooner or later the ground on which they are placed becomes infected with them through overcrowding, which is a common fault of poultry management.

A great demand is made upon the resistive forces of the birds' system on account of these conditions, and there is a continuous demand for the production of defensive blood cells; the demand finally exceeds the supply, and the blood-forming organs cease to produce normal blood cells, but produce numbers of imperfectly formed cells; these circulate in the body and become deposited in the nerves and other organs, and the characteristic symptoms of fowl paralysis are then seen.

XUM

Fresh air, green food and the feeding of grain, which necessitates scratching for food in the open air and thus ensuring effective respiration with expansion of residual air in the air sacs, are most important factors for maintaining health in birds. For some years poultry practice has had the effect of discouraging efficient oxygenation of the body with the result that diseases of the circulatory system and of the blood-forming organs have increased enormously.

In the majority of cases of fowl paralysis there is present at post-mortem an inflammation of the inner lining of the intestines due to coccidiosis, worm infestation, or to some other cause. Following the damage to the intestine from these or other causes, infective agents such as toxins produced by certain bacteria present in the alimentary canal gain entrance to the blood and lymph stream of the bird. Excessive demands are now made upon the blood-forming organs with the result that the supply of normal defence cells becomes exhausted, as previously stated, and the immature lymphoid and other cells are produced and deposited in the various organs and nerves. These facts point to the necessity of keeping chickens until fully mature from contact with ground which has been previously used by fowls, and of ensuring that the strictest hygienic methods are carried out.

Paralytic symptoms occur as a symptom of certain forms of coccidiosis and of tapeworm infestation. Polyneuritis, or generalised paralysis, occurs in fowls due to a deficiency of vitamin B, the anti-neuritic vitamin. Where there is a lack of green food, milk and grain, this type of paralysis is liable to occur. Some authorities believe that fowl paralysis is the result of infection with a specific filterable virus. It is difficult to accept this view as the main cause, because only a comparatively small percentage of birds which are artificially inoculated with the filtered material from diseased birds develop the disease, and it is often found that some of the control birds which are not inoculated and kept from contact with the artificially infected birds develop the disease.

It is my opinion that if the main principles of hygiene were applied by poultry breeders to their flocks, the disease complex popularly known as fowl paralysis would cease to be of serious importance.

Coccidiosis.

Fowls are particularly susceptible to protozoan diseases, and the disease which causes the most serious losses in poultry is coccidiosis, caused by a unicellular organism belonging to the protozoa. The disease affects the intestinal tract, and at least six different species of coccidia have been described from outbreaks of coccidiosis in chickens. *Eimeria tenella* is chiefly responsible for the cæca type which affects young chickens and causes the typical symptoms of drowsiness, diarrhœa with blood-stained fæces, excessive thirst, anæmia and loss of condition.

The lesions shown at post-mortem examination of this type of the disease chiefly affect the cæca, which appear larger than normal and may stand out like the distended fingers of a glove. The cæca are often filled with blood or they may be harder than normal due to the organisation of inflammatory exudate

from the cellular damage of their inner lining by the coccidia. Small hæmorrhagic areas of the inner lining or ulceration are sometimes present. The cæcal contents, blood and cell detritus all contain thousands of oöcysts; these, when passed out with the "droppings," develop into sporulated or infective oöcysts. When the sporulated oöcysts are picked up by healthy chicks they are acted upon by the digestive juices of the alimentary canal, the shell ruptures, and sporocysts containing sporozoites are passed out, the sporozoites enter the cells of the intestines, multiplication takes place within the cells, leading to the destruction of many cells and the liberation of large numbers of merozoites, which attack other cells; this goes on for some time and oöcysts are again produced. The sporulated cysts are picked up from the ground and many chickens become affected. The heaviest losses occur about a week or ten days after the first chickens are seen to be ill; some recover, but are often unthrifty and unprofitable birds, particularly if they have been severely attacked. The total mortality varies greatly; it may be as much as 90 per cent. or more. This type of the disease most commonly occurs in chickens from ten days to three months of age. Occasionally adult pullets which have been reared free from contact with the organisms may be subjected to a heavy infestation, and acute cæcal coccidiosis with the passage of blood in the fæces result. Chronic coccidiosis is generally caused by another species of coccidium known as *Eimeria necatrix*. (?)

The chronic type of the disease generally attacks chickens of from three and a-half to six months of age. The lesions are chiefly found in the duodenum, that is, the first part of the small intestines. The bowel walls are thickened and inflamed, sometimes white spots may be present with orange-coloured exudate deposited in their inner lining. Extreme emaciation is often seen, and in these cases the whole length of the intestines may be studded with ulcers resembling tubercles to the naked eye and impossible of differentiation from tuberculosis affecting the intestines without a microscopic examination.

Another type of chronic coccidiosis presents lesions consisting of small hæmorrhagic areas with blood in the exudate; on account of the mixture of blood with the fæces there is an alteration in their colour to a golden-yellow or brown, in addition to which blood and mucus may be present in them.

Diagnosis depends upon a microscopical examination of the intestinal contents with the demonstration of the coccidial oöcysts.

Control methods depend upon the application of strict hygienic measures, such as daily cleaning out, cleansing and disinfection of utensils, food troughs, water vessels, etc., and arranging them for use so that the birds cannot contaminate them with their "droppings." Folding units are valuable for the control of coccidiosis on account of the frequent moving of the units which prevents the birds from picking up the oöcysts in the infective stage.

Milk, or milk products, are valuable foods to supplement the rations of birds affected with coccidiosis in that they help to build up the resistance of the birds. Up to twenty per cent. of the ration may consist of milk to the advantage of the birds' health.

XUM

The above are examples of diseases which are becoming of increasing importance to poultry keepers. In addition to these deficiency diseases, avian tuberculosis, pullorum disease and fowl pox are all too common. Greater use should be made of the various known means of prevention of these diseases, which include the provision of well-lighted and well-ventilated houses, the application of the tuberculin test for tuberculosis, the agglutination test for pullorum disease (B.W.D.) carriers, more general vaccination against fowl pox, and stricter sanitation methods.

The use of large houses or units should be discontinued for rearing and breeding purposes.

OBSERVATIONS ON AN OUTBREAK OF FOWL PARALYSIS.

By J. W. JOHNSTON,
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J. E. WILSON, B.Sc., M.R.C.V.S.,
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POULTRY research at the Rowett Institute has recently been concentrated on the study of an outbreak of disease which occurred in 1934, and has persisted in the poultry stock since that date.

That study has been undertaken in order, if possible, to control the disease sufficiently to allow research on poultry nutrition, which is the proper work of the Institute, to be recommenced. Since the disease outbreak in 1934, mortality and culling have been of such extent as to render profitable nutritional research impossible. Therefore, apart from a comprehensive but relatively unfruitful study of the influence of diet on the course and incidence of the disease, the work of the Rowett Institute since 1934 has, as regards poultry, been directed towards the study and control of this disease.

A general picture of production in the Rowett Institute's poultry stock prior to the outbreak of the disease is shown in Table I. The figures are those for 1933, the last year of profitable production on the plant.

TABLE I.

	W. Leghorns	R.I. Reds	W. Wyandottes
Mortality during growing period, per cent.	2.9	0	5.3
Number of pullets at commencement of laying ...	808	112	89
Average annual egg production*	186	141	169
Mortality during pullet year, per cent.	12.7	3.6	6.8

* The figure for annual egg production is obtained by dividing the total number of eggs produced during the year by the number of pullets at the commencement of laying.

The poultry plant in 1933 was productive and profitable. Then, in July, 1934, serious disease appeared. A characteristic form of leg weakness which had never been previously noted in the flock was the first symptom observed. This symptom was first noticed in July, 1934, and it appeared almost simultaneously in White Leghorns and in Rhode Island Reds, penned at opposite ends of the poultry plant. By September of 1934 this condition of leg weakness had made its appearance in all four breeds kept on the farm, *viz.*, White Leghorns, Rhode Island Reds, White Wyandottes and Welsummers. Other symptoms noted were drooping of the wing, twisting of the head and neck, a flaccid condition of the crop and certain less definite symptoms, such as loss of condition, unthriftiness, and slow rate of maturity.

In many cases a loss of outline of the pupil was noted together with a loss of pigment of the iris. In other cases a very marked distortion of the pupil occurred.

TABLE II.

	W. Leghorns		R.I. Reds	
	1933	1935	1933	1935
Mortality during growing period	2.9	19.4	—	14.1
Number of pullets at commencement of laying ...	808	812	112	213
Average annual egg production	186	63.7	141	68.6
Mortality during pullet year	12.7	77.5	6.8	66.7

Birds that were one year old and over at the time remained apparently healthy, even when penned in runs adjoining affected pens.

The effect of the disease outbreak on the flock is shown by a comparison between the mortality and production of the flock in 1933, before the disease outbreak occurred, with the corresponding figures for 1935, the year after the initial outbreak of disease. These figures are shown in Table II.

The most striking feature of this comparison is the great and sudden increase in the mortality of young birds, and particularly in the mortality of pullets.

In every year since 1934 mortality, except during the rearing period, has been exceedingly high, while the annual production and profit have been abnormally low.

In 1934 a small number of diseased birds was sent to certain laboratories for post-mortem examination. These reports suggested coccidiosis as the main factor in the disease outbreak. On the basis of this evidence special hygienic measures were resorted to, including addition of disinfectants to the drinking water and daily removal of litter, combined with regular culling of sick birds.

Thus, in 1935, the brooder house was scrubbed, blow-lamped and creosoted inside, and the grass runs attached to the brooder house limed, dug, and resown. A special attendant who had no contact with the rest of the stock was provided.

XUM

When eight weeks of age the pullets were removed to outlying parts of the farm, where either sterilised or new equipment was provided, and where poultry had not previously been kept. Meanwhile, the laying houses on the central plant were cleaned and creosoted, and the grass runs attached to the laying houses kept clear of poultry for two months.

These hygienic measures were completely unsuccessful in controlling the disease. The disease appeared in the outlying colonies long before the pullets were ready to return to their central laying quarters. The mortality among pullets was high. On one outlying colony of 507 pullets, 10.1 per cent. died before return to their laying quarters. On the other outlying colony of 238 pullets, 14.3 per cent. died before their return. Among the survivors returned to the central plant mortality was as high as in the previous year.

Further post-mortem examinations revealed that neuro-lymphomatosis, in addition to coccidiosis, was present in the stock. Meanwhile investigations of the effect of diet on the disease were continued. The stock dietary was approximately the same before and after the outbreak described. In the previous year a few lots had been reared on deficient diets, but the incidence of disease subsequently did not appear to be affected to any appreciable extent. Indeed, there was evidence in certain comparisons of protein level for egg laying that the lowel level, which was considered on the border line of deficiency, tended to retard the onset of symptoms of the disease.

From results of poultry feeding trials at the Rowett Institute, milk has been highly valued in the rearing of the commerical stock for the last ten years. The feeding trials of 1935 included a large-scale test of the value of skimmed milk, both sour and fresh, with particular reference to the effect on this disease. While a certain benefit was found for egg production, mortality during the period 3 to 8 months was only reduced from 60 per cent. to 45 per cent. A comparison of wet and dry mash feeding was also made. The advantage, if any, of wet mash was again small.

No doubt any measure which ensures that the food is easily accessible, and that it is in such a form that it can be quickly consumed, will defer death from starvation in paralysed birds. It is reasonable to suppose also that when milk instead of water is offered to drink, the weakly birds will get more sustenance than their condition would otherwise allow.

The general impression gathered was that nutrition had no appreciable effect in controlling the disease.

In 1936 a further attempt was made to re-establish a healthy poultry colony from the original diseased plant. As a survey of the incidence of fowl paralysis on a small number of farms in Scotland was being carried out at the Royal (Dick) Veterinary College by means of a grant from the Agricultural Research Council, it was arranged that in 1936 the Duthie Stock Farm should participate in this survey and that all birds which died on the farm should be sent to the Royal (Dick) Veterinary College for a detailed post-mortem examination.

XUM

As breeding stock from which to found this colony, birds hatched in 1933 were again chosen. These birds, as previously stated, had never shown the characteristic symptoms of the disease. Chicks from this stock were taken as day-olds to a sterilised plant on an isolated part of the farm in the charge of a separate attendant. Chicks from the same stock reared in the parent colony served as controls. The important difference in this attempt at isolation made in 1936, as compared with that made in 1935, was that the chicks from the original (diseased) stock were removed as day-olds instead of at eight weeks of age. The feeding and management in the two plants was as similar as was practicable.

This change in the method of isolation made a profound difference to the results. Whereas in 1935 the mortality and disease among the isolated stock was of the same kind and order as in the original (diseased) stock, in 1936 the

TABLE III.—PROGENY OF 1933 HENS.

	In parent colony	In isolated colony
Number of chicks (day-old)	458	1015
Mortality during rearing, per cent.	9.8	4.4
Number of pullets at two months (1st June) ...	207	450
Average egg production of pullets to 31st December	22.12	62.55
Percentage mortality to 31st December	36.7	4.89
Percentage mortality from fowl paralysis	14.01	0.89
Percentage mortality from coccidiosis	15.46	1.11
Percentage mortality from other causes	7.23	2.89

isolated stock at the date of this report remain productive, profitable and reasonably healthy. The figures in Table III show the mortality and production of the White Leghorns in the isolated (1936) colony in comparison with their controls in the original stock.

In the 1936 outbreak the symptoms were similar to those observed during the initial attack in 1934, and in many cases were suggestive of neuro-lymphomatosis. Birds showing paralytic symptoms were culled soon after the disease was noticed, but those which showed signs of unthriftiness without definite symptoms of paralysis were allowed to live until their condition necessitated their destruction. Thus every bird which died or was culled was submitted to a complete post-mortem examination.

In view of the results obtained it may be desirable to detail the method of examination. After examining the various organs for evidence of infiltrations, tumours, etc., the larger nerves were completely dissected. These included, in order of examination, the cervical spinal nerves, vagus, brachial plexus, intercostals, splanchnic ,lumbar plexus, sciatics, hypogastric, etc. It is most important

XUM

to follow the complete course of the sciatic nerve as occasionally thickening may be noted only at the proximal or distal ends. The splanchnic nerve was commonly found to be the only one affected, and in several cases of sudden death a massive enlargement of the vagus was noted. Soft tumours, as described by many authors, were frequently observed.

The diagnosis was confirmed by microscopical examination of portions of the nerves and/or organs where these showed evidence of affection. Apparently normal nerves were not examined microscopically, nor were the brain and cord.

With regard to lesions affecting the eyes, which have been so common in previous years, so far few cases have been submitted for examination, as, although iritis is present in many of the birds, it is not sufficiently advanced to warrant the destruction of the bird. An examination was made for the presence of coccidia

TABLE IV.

	White Leghorns (Rowett controls)	Brown Leghorns (Dr. Greenwood's)
Number of pullets and cockerels, 2 months old (1st July)	73	66
Mortality (per cent.) between 2 months and 31st Dec. ...	24.66	27.27
Total number of birds dead between 2 months and 31st December...	18	18
Number of birds dead of fowl paralysis	8	9
Number of birds dead of coccidiosis	5	5
Number of birds dead of other causes	5	4

in every case, and the intestines of each bird were then forwarded to Dr. Morgan, Lecturer in Helminthology, Royal (Dick) Veterinary College, who carried out worm counts.*

As will be seen from the foregoing table, many cases of coccidiosis were encountered. The number given does not give a completely true picture, as many of the cases designated fowl paralysis also had heavy infestations with coccidia.

It is clear that isolation of day-old chicks, the progeny of apparently healthy birds, did not completely eliminate either lymphomatosis or coccidiosis. Although no clinical cases of fowl paralysis were observed, the post-mortem examination revealed four cases. It must be emphasised that the conditions of isolation imposed on this colony were merely those which might be secured, with care, on a commercial farm. In the scientific sense of the term, there was no true isolation.

In order to obtain further light on the nature of the disease, or diseases, affecting the poultry stock of the Rowett Institute, hatching eggs were supplied by Dr.

* The results concerning worm infestation in the fowls examined during the investigation will be recorded in a separate communication.

Greenwood, of the Institute of Animal Genetics, Edinburgh, from his strain of Brown Leghorns. The eggs were hatched out among White Leghorn control eggs from the Rowett Institute diseased stock, and both the Brown Leghorn chickens and the White Leghorn controls exposed to maximum contact with the original (diseased) stock of the Rowett Institute. Maximum contact was secured in two separate ways: (1) The chickens were reared and housed in the centre of the original (diseased) stock; (2) clinical cases of fowl paralysis were introduced amongst them. The result of the experiment is detailed in Table IV.

It will be noted that the Brown Leghorns became affected with fowl paralysis to a similar extent as the control birds. This is very significant, as, so far as is known, there is no history of any case of fowl paralysis having previously occurred amongst Dr. Greenwood's stock. This stock has never shown any clinical signs of neurolymphomatosis and no fresh blood has been introduced for many years. Moreover, during the past six years all birds dying have been examined by one of us (J. E. Wilson) using the same technique as employed in the examination of birds received from the Rowett Institute. In no case has post-mortem examination revealed any evidence of lymphomatosis. The symptoms manifested by the Brown Leghorns at the Rowett Research Institute were considered to be those associated with fowl paralysis and the diagnosis was comfirmed in the manner previously described.

Discussion.

The figures obtained from the isolation experiment are of great interest (Table III). There is a very marked decrease in the mortality rate of the isolated stock and a great difference in the incidence of fowl paralysis. The egg production also shows a marked increase in the isolated stock, which as regards both productivity and profit attained the high level characteristic of the Rowett Institute's poultry stock previous to the outbreak of epidemic disease in 1934.

This experiment shows that in the present instance, when chicks are transferred to fresh ground as day-olds it is possible to rear them with a minimum mortality and to reduce very materially the incidence of fowl paralysis among them.

With regard to the difference in the incidence of fowl paralysis in the isolated as compared with the controls in the original plant, there are so many possible factors that were uncontrolled, or partially controlled, that it is impossible to draw any definite conclusions as to the relative importance of the various factors concerned.

With regard to Dr. Greenwood's Brown Leghorns, however, the case is much clearer. The transference of eggs from a stock which can be considered with confidence as being free from fowl paralysis to a stock where that disease was known to be prevalent, is in the nature of a controlled experiment. There is no doubt that certain of Dr. Greenwood's birds, when submitted to contact with stock suffering from fowl paralysis, developed fowl paralysis themselves, thus showing that these birds had no natural immunity against the disease. The only question at issue is whether the birds developed fowl paralysis as a result of

XUM

exposure to a definite infection, or whether the lesions of fowl paralysis demonstrated in them were an unspecific reaction to certain undefined conditions occurring in the plant to which they were transferred.

This question cannot be definitely settled by the results described in this communication. It is clear that if Dr. Greenwood's birds developed fowl paralysis as a direct result of a specific infection, then birds from the same stock submitted to close contact with stock known to be suffering from fowl paralysis should themselves develop fowl paralysis under varied conditions of environment. On the other hand, should the development of fowl paralysis in these birds be due to unspecific environmental conditions, then it should be possible to produce fowl paralysis in these birds under certain conditions without exposing them to contact with affected stock.

These possibilities require further experimentation before a decision can be made. Such experiments are under consideration.

Acknowledgments.—We wish to acknowledge our indebtedness to Dr. Fraser, of the Rowett Research Institute, for his interest in the work and for many helpful suggestions.

POULTRY MORTALITY.

By G. MAYALL, M.R.C.V.S.
Bolton.

THERE has been a good deal of comment in the Press and among poultrymen about the excessive mortality among fowls during the past year. It has been assumed that this is almost entirely due to the greater prevalence of contagious and infectious diseases, such as roup, fowl pox, coccidiosis, etc., and no doubt this is largely true; but the man who conducts a number of poultry post-mortems in a year will find a very large percentage of deaths due to wrong methods of feeding, irregular and deficient feeding, and dirty ground and water (especially in damp and foggy weather).

One of the most glaring faults in feeding, and one most easily ascertained, because so plain to observe, is the feeding of fowls entirely on *whole maize.* One finds the crop filled with the grain, the true stomach invaded, and the gizzard filled to repletion with it. Examination of the gizzard contents will reveal the corn entirely undigested and almost the same as before it was taken up by the bird. The liver is fatty infiltrated, and the heart thin and flabby, and probably containing ante-mortem clots of blood.

One writer (Harry R. Lewis, B.S., M.Agr.) states: "A great many of the farm flocks throughout the country are maintained almost entirely upon an exclusive corn [Americans always call 'maize' corn—G.M.] which results in a very small and usually an unprofitable egg yield. The facts that corn is easily digested [it depends on what form it is given in, and the amount—G.M.] and is a rapid fat former make it a very undesirable feed for mature birds in close

confinement, if egg-laying is desired." Even cracked maize, if given without care and in excessive quantities, is a bad food.

The next fault in feeding which brings about not a few deaths is the giving of *unclipped oats*. The long stiff glumes of the grain injure the crop, and especially entangle old fibrous grass in the autumn of the year, leading to crop binding and death from exhaustion. Oats should always be clipped, and are not as good a grain food as some poultrymen seem to think.

Old grass in itself causes many deaths from crop binding, and no ground is good for poultry unless this matter is attended to, especially in the fall of the year.

A third cause of many deaths is *dirty ground and the drinking of water from mud puddles*. It is very important that fowls should have an abundant supply of fresh clean water. " It fills up and distends the tissues, giving them a plump appearance. It aids in digestion by dissolving particles of food so that the digestive fluids can act on them more readily. It aids in transporting of digested matter and greatly hastens assimilation by stimulating diffusion. It aids greatly in the regulation of body temperature. The need of keeping fresh pure water constantly accessible to birds cannot be too strongly emphasised." (H. K. Lewis, B.S., M.Agr.).

The enormous increase of poultry breeding and rearing has in many cases been conducted in a rash and haphazard manner, and has led to the occupation of much ground quite unsuitable for poultry life and health. A little amelioration of bad ground may be made by raking it over deeply, strewing some fresh lime on it, and renewing the surface with clean fresh earth. All mud puddles should be filled up.

Where fowls on free range are dying of access to dirty water or ground, or lack of nutritious food (due to the owner's idea that they are quite capable of fending for themselves if given plenty of liberty), they must be brought up and penned on clean ground with any old grass cut down, and be fed properly.

The *injudicious use of house scraps*, such as bacon rinds, scraps of old meat, potato parings, old tinned peas or beans, causes not a few deaths from botulism or ptomaine poisoning. *Too much salt* in a mash may easily kill a number of fowls. Lewis says: "Salt in the food is supplied to increase palatability and to aid digestion. It should be supplied when necessary in the ration to the extent of not over four ounces to every one hundred pounds of dry feed." We have never seen it used. A gizzard packed with dirt and intestines filled with dirty slime, apart from mechanical injury, do not lend themselves to any exact determination of what bacterial infection has also aided in the death. A great many chicks die, in our opinion, during the season on excessive feeding of dry mash and insufficient liquid nourishment. A good deal can be said for the Lancashire method of kibbled wheat (known locally as " cockle ") feeding for chicks.

If we were asked what is the safest and most satisfactory method of feeding adult fowls (although not necessarily the cheapest course), we should say a basis

of wheat and dari morning and noon, and a mash of middlings at night. Many poultrymen have neither the time nor the intelligence to estimate exact food values, and probably more than half of them feed by weight or rule-of-thumb.

LITERATURE.

" Productive Poultry Husbandry," by Harry R. Lewis, Professor of Poultry Husbandry, New Jersey State University.

Lippincotts " Farm Manuals," edited by K. C. Davis, Ph.D. (Cornell).

SOME NOTES ON LYMPHOMATOSIS GALLINARUM.

By H. P. HAMILTON, B.V.Sc. (Toronto).

Director of the Poultry Pathological Research Laboratory, Goring, Reading.

THE history and pathological features of the disease *Lymphomatosis gallinarum*, commonly, but it is thought erroneously, termed fowl paralysis, have been cited so often and been published in these columns, that, other than a casual survey, their reiteration at this juncture would be slightly unwarranted.

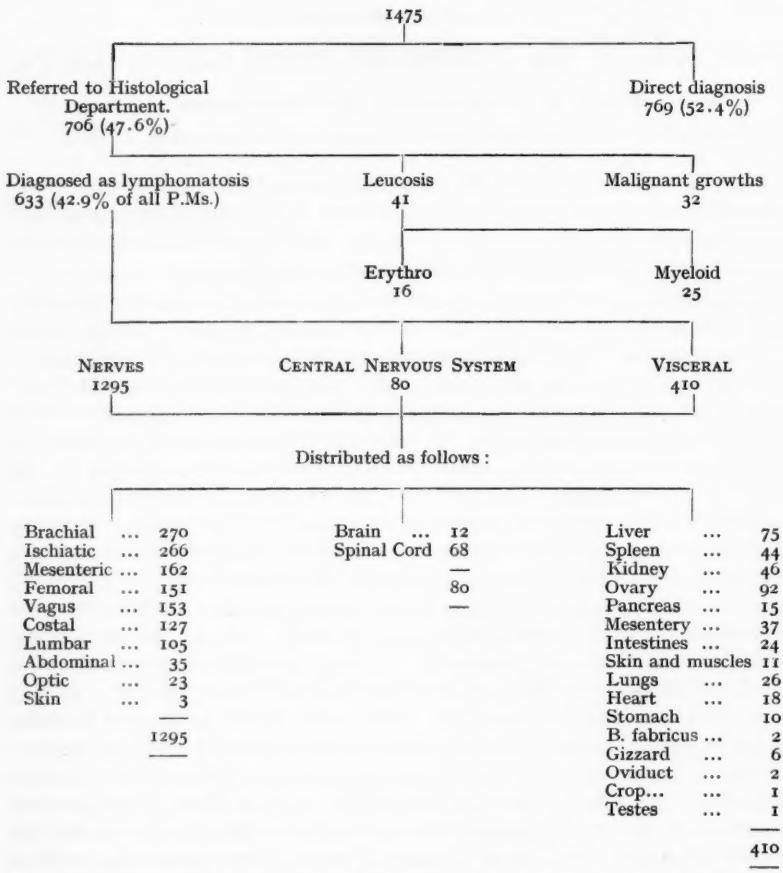
Lymphomatosis, or " fowl paralysis " as it was then called, was first cited as a specific disease by Marek[1] in 1907, and was subsequently verified by Kaupp[2] (1921) and Pappenheimer *et al.*[3] (1926), and many other workers. The disease is characterised by aggregations of cells of the " undifferentiated lymphoid class " in any organ or nerve of the body, such cellular proliferations, appearing to have special affinity for nervous tissue. It was thought that only nervous tissue was affected, and a suitable explanation of such phenomena was afforded by the theory of a neuro-tropic virus, and that the corresponding tumorous growths of the viscera were considered as either accidental concurrent tumours or merely secondary features. These tumours were diversely classified as " lymphoma, lympho-sarcoma, lymphocytoma, lymphatic leukæmia," etc. The general consensus of opinion now operating is that both tumorous growths and nerve infiltrations are manifestations of one disease entity, and the general heading, *Lymphomatosis gallinarum* is suggested as a suitable and descriptive classification of such a condition. It will be apparent that the term " fowl paralysis " can only apply when the disease affects those nerves, such as the brachial or ischiatic, which give rise to the external macroscopical signs of paralysis of the wing or leg, and one could not say that a bird is paralysed with an infiltration of the vagus nerve or a lymphomatous tumour, say, of the ovary or liver. Fowl paralysis only refers to one or two manifestations of a disease entity, and is merely the outward expression of a phase of such disease. Lymphomatosis, qualified by the adjective of its organic affectation, is a term now accepted, *e.g.*, neuro-lymphomatosis, hepatic lymphomatosis, ovarian lymphomatosis, renal lymphomatosis, etc.

A statistical analysis of birds received for post-mortem examination at this laboratory during a period of four months—April 1st to August 6th—shows the

distribution of the cellular invasions, and a perusal of these, set out in the form of a genealogical tree, will prove instructive and qualify the contentions relative to the nomenclature.

It will be seen from the accompanying table that 1,475 adult birds were received for post-mortem examination. Of these 1,475 birds, 706 (47.6 per cent.) required

TOTAL ADULT POST-MORTEM EXAMINATIONS.



further microscopic work in order that we might arrive at a definite diagnosis. On examination of the sections cut from various parts and nerves, it was found that 633 (42.9 per cent. of all birds received) were suffering from lymphomatosis in one or more organ or nerve. Curiously enough, Dalling, in the " Year Book of the Scientific Poultry Breeders' Association " for 1936, reports the incidence

of lymphomatosis in birds examined at the Wellcome Physiological Laboratories as 42.9 per cent., *exactly* the same figure as quoted above. The distribution of affected tissues is appended in the table. There were in this work, covering eighteen weeks, sixteen different organs affected (excluding nerves). There were eleven different nerves in the body affected as well as the brain and spinal cord.

The ante-mortem diagnosis of the disease is far from easy. In general, physical paralysis may occur through muscular weakness such as is caused by rickets, avitaminosis, coccidiosis, intestinal parasitosis, leucosis, tumours, etc. In cases of leg involvement a comparatively reliable differential diagnosis is obtained by suddenly lowering the bird to the ground, when, in ischiatic neurolymphomatosis, absence of reflex action is noted, with complete loss of extension and fanning of the digits. With involvement of the brain there is often a spastic condition of the neck muscles with " neck weaving " or burying movements of of the head (Seagar[4]).

Recently much attention has been paid to the inferences to be drawn from the eye colour of birds as a means of diagnosing lymphomatosis. The illustrations show the varying eye conditions : Fig. 1, normal R.I.R. hen ; Fig. 2, Depigmentation of the iris rim ; and Fig. 3, distortion of the pupil with progressive depigmentation. The eyes illustrated in Figs. 2 and 3 are considered diagnostic features of the condition and at the moment of writing these features have been elaborated so much that eighteen different categories of eyes are now recognised. How far these are diagnostic features or merely variations from normal or congenital defects is a matter of conjecture. Suffice it to say that much more work must be carried out in this connection before any dogmatic statements can be made. Further studies in collaboration with a member of the medical profession specialising in ophthalmology are in progress at this laboratory.

Lymphomatosis can only be definitely established by a histological examination of the affected tissues. In March last the writer carried out a routine histological examination of every bird that was received for post-mortem irrespective of the cause of death. This examination showed that many nerves which macroscopically appear enlarged, and in the absence of histological examination would be diagnosed as affected with a lymphomatous infiltration, are, on subjection to the final court of appeal, *viz.*, the microscope, found to be free from any such infiltration, the abnormality noted being non-specific. Conversely, many nerves which fall under the macroscopically normal category are found on microscopical examination to be infiltrated with the typical specific lymphoid type of cells. The accompanying microphotographs support the absolute necessity of complete post-mortem technique before a final and correct diagnosis can be made. The microphotographs, correlated with their captions, require no further explanation. Out of 201 birds examined during this experiment, 79 cases were observed in which the nerves appeared macroscopically normal, but which microscopically were found to be infiltrated in varying degrees.

Much attention has been paid to intestinal parasitosis as a specific ætiological factor. Seagar,[4] inferring a causative neurotropic virus, laid stress on the supposed entry of such through the parasitically damaged mucosa of the intestine. Emmel,[5] working on the theory of hæmocytoblastosis produced by bacterial invasion through the parasitically-damaged mucosa of the intestine, claimed to have induced " fowl paralysis, leukæmia, and allied conditions " in fowls. This worker, however, concluded that some other factor was required before *neuro*-lymphomatosis could be induced. Dalling,[6] working with the same organisms and adopting Emmel's technique, was unable to confirm his observations. Thomas and Hamilton,[8] in a statistical analysis of a " thousand cases of fowl paralysis," found that the peak incidence of enteritis associated with intestinal parasitosis occurred at a date some weeks subsequent to the peak incidence of lymphomatosis, and concluded therefrom that no specific ætiological agency could be ascribed to such parasitosis. Dalling and Warrack,[7] confirming these observations, state : " Intestinal parasitic infestation plays no essential part in the causation of lymphomatosis in fowls." In the course of the critical examination, histologically, of the 201 birds during March, 1936, already quoted, the writer was impressed by the large number of mesenteric nerve involvements, *viz.*, 59 per cent. These involvements noted during the examination of the first 40 of the 201 birds led to the further histological examination of the remaining 161 intestines. The result of this work showed that increased lymphoid activity with cellular excess occurred in 83 cases, or 51 per cent. It must not be inferred that such excess of lymphoid cells were organised into neoplasms, although in many cases involvement of the muscular wall was apparent. Normal control birds were obtained, killed, and the intestines examined and accepted as a criterion of normality. Any great excess of cells in the stroma or disorganisation of Bruner's glands with subsequent " overflowing " into the surrounding tissues was regarded as a feature of lymphomatosis, obviously as its name implies ; but it could not, of course, be inferred that such a bird would ultimately succumb to such specific condition. It is possible that excess feeding for egg production, or excess of one ingredient of the food, is responsible for this hyperactivity, although it cannot be said that such a condition would give rise to the ultimate disease entity as we now know it. Further work must be carried out on these lines before the suggestion can be entirely negatived. It was thought, after observing a very high percentage of enlarged gall-bladders and external evidences of scour in the 201 birds examined in March, 1936, that metabolism of fat might be associated with the inducement of the condition, and to prove or disprove this hypothesis an experiment is now in progress whereby birds are being fed from day old on rations containing varying amounts of fat. It is hoped to publish the results of this experiment at a later date.

There is much evidence to support the rôle of inheritance in inducing the condition. Dalling and Warrack[7] quote some interesting findings in this respect. On the other hand, this does not suitably explain the spontaneous outbreaks

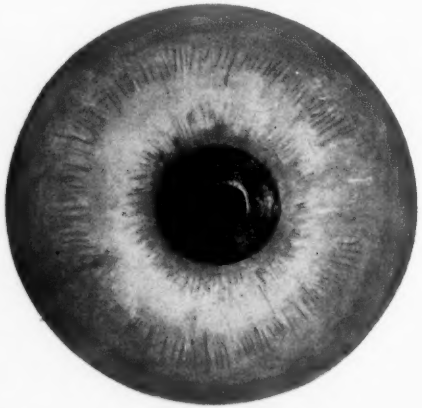
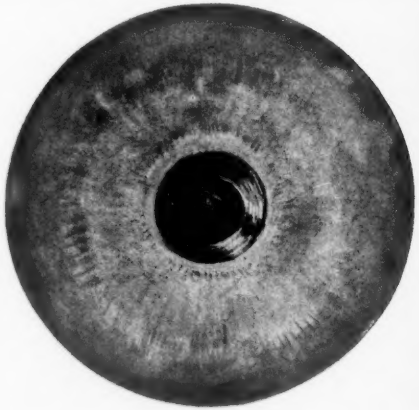


FIG.1



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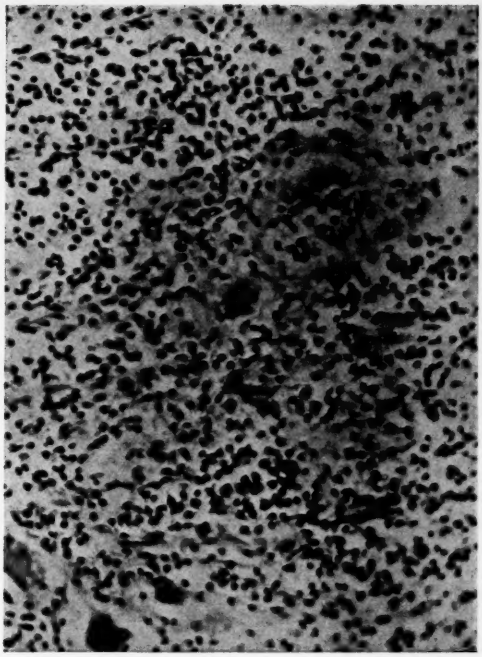
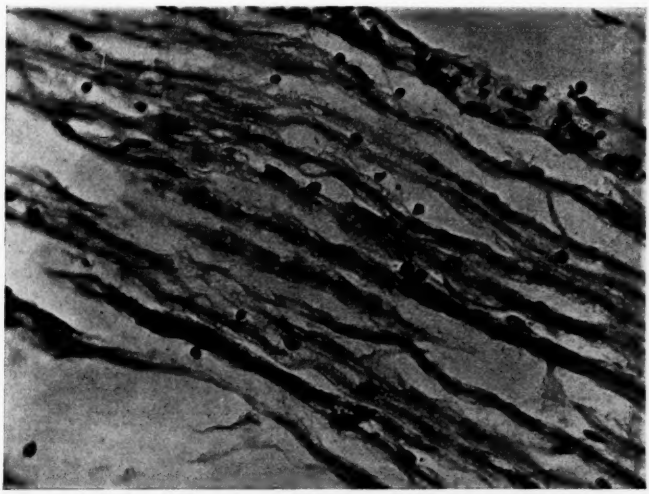
BIRD 71.—Ischiatic nerve, showing normality. In this instance the post-mortem report was " Ischiatic nerve enlarged." × 1/6 obj.



BIRD 151.—Mesenteric nerve, showing an infiltration of lymphoid cells. This mesenteric nerve was reported normal on macroscopic examination. × 1/6 obj.



BIRD 144.—Ischiatic nerve. In this case the macroscopic report indicated that this nerve was heavily infiltrated. The only microscopic field in which there were any lymphoid cells whatever has been photographed, demonstrating how few cells in fact were present. It is considered that the number noted was certainly not enough to cause an enlargement such as was reported. × 1/6 obj. (*Red blood cells can be seen in top right-hand corner.*)

(*Article by* H. P. Hamilton, B.V.Sc. (Toronto), *page* 21)

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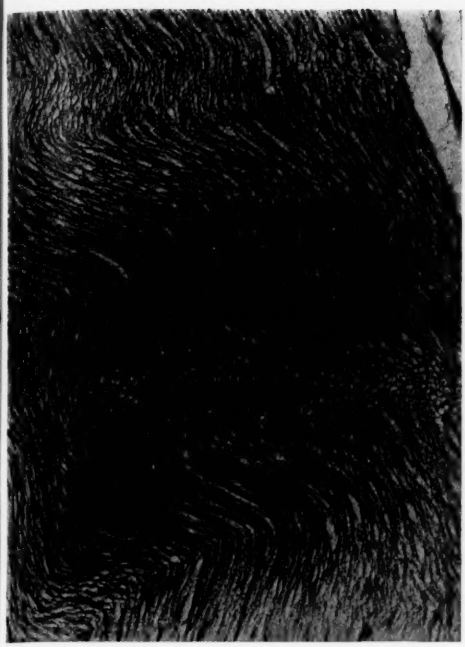
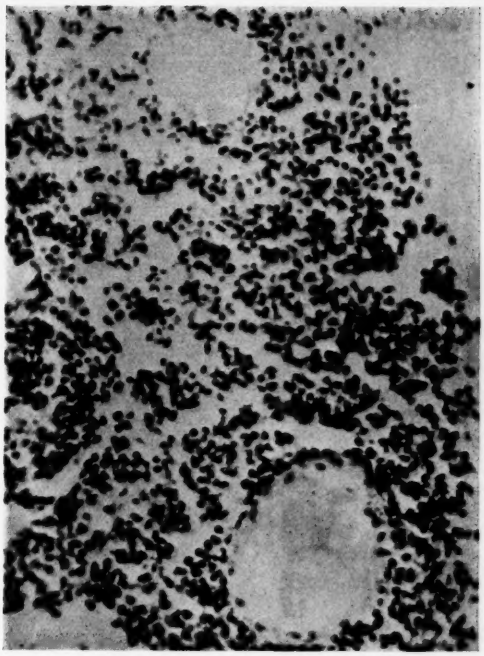
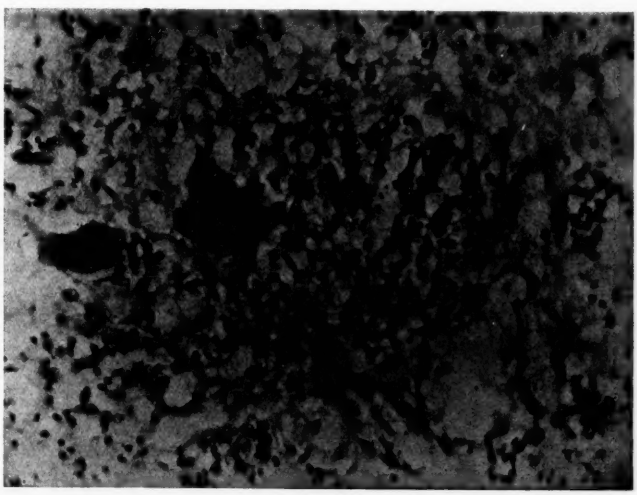


BIRD 71.—Brachial nerve. This nerve was reported as being "greatly enlarged" on macroscopic examination. It should be noted that the same diagnosis was given in respect of the ischiatic nerve of the same bird. × 1/6 obj.



BIRD 142.—Ovary, showing the follicles completely surrounded by lymphoid tissue. × 1/6 obj.



BIRD 55.—Spinal cord, showing area of dense lymphoid infiltration. ×$\frac{1}{4}$1/6 obj.

(*Article by* H. P. Hamilton, B.V.Sc. (Toronto), *page* 21)

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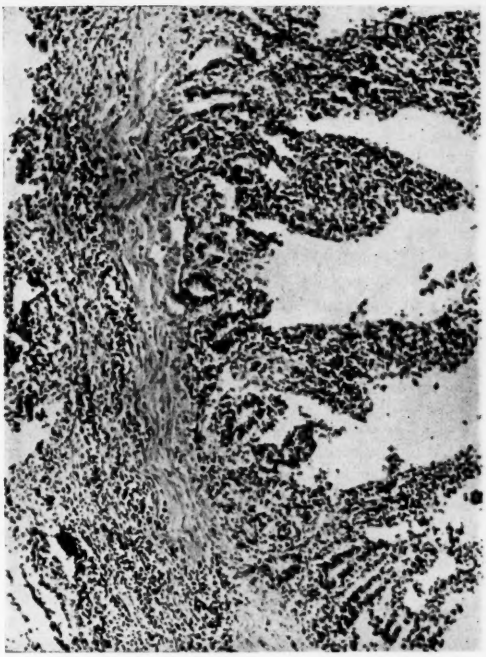
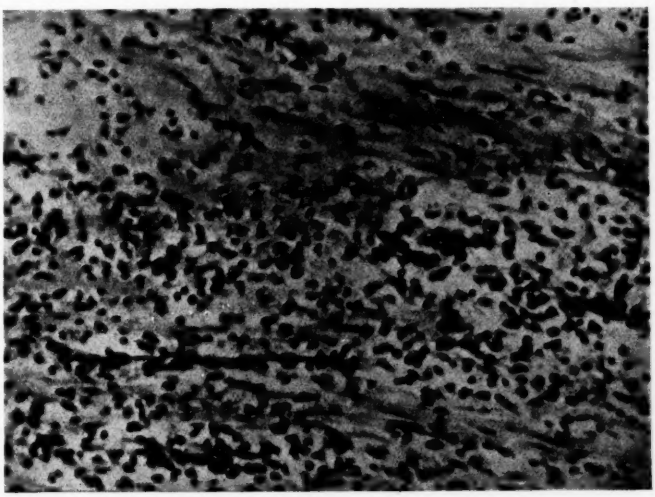
Intestine of a normal control bird referred to in text. The evenly spaced glands and lymph nodes can be seen, and attention is drawn to the total absence of lymphoid cells in the muscle fibres. The columnar epithelium is also clearly demonstrated. × 1/6 obj.



BIRD 151.—Intestine. This picture shows (1) the digestion of columnar epithelium due to post-mortem change. (2) Abnormal number of large lymphocytes between the lymph nodes and glands. (3) The infiltration into the musculature of typical lymphoid cells. × 2/3 obj.



BIRD 122.—Intestine, showing dense infiltration of lymphoid cells into the musculature. × 1/6 obj.

(*Article by* H. P. Hamilton, B.V.Sc. (Toronto), *page* 21)

which are often encountered. By virtue of the specificity of the disease one common ætiological factor (virus ?) is suggested. It may be that such a virus (*sic*) is present in every bird, and only requires the inheritance of inducing factors (enhanced possibly by the continued breeding from predisposed stock) or the assistance of environmental stress to enable it to flare up. On the other hand, it may be that the specific factor, whilst occupying a non-disease-producing position in the parent, is by virtue of passage exalted to such a state of pathogenicity when the environmental stress associated with early laying propensity is present or is consequent upon the physiological disturbances associated with such activity.

The writer would wish to stress several points in conclusion. Firstly, that a definite and uniform technique be adopted by all those engaged in routine diagnosis and the adoption of the term " lymphomatosis " (qualified by a prefix indicating the site of affection) in place of " fowl paralysis." Secondly, the necessity of collaboration with breeders, nutritionalists and biochemists appears to be essential. Thirdly, the realisation that no one organisation or laboratory can individually solve the problem, the interchange of views and results obtained at many centres, fully equipped and staffed, being necessary. Fourthly, no final and complete diagnosis can be made without histological examination of all organs suspected of being affected either by infiltration or neoplasms. The mere observance (macroscopically) of an enlarged nerve is no justification for a report of neurolymphomatosis. The fact that infiltration has been histologically confirmed in eleven different nerves confirms the necessity of extremely careful examination by the pathologist carrying out routine examinations.

The writer is indebted to Mr. MacDonald, University College Medical School, London, who took the microphotographs, and to his assistant, R. A. S. Gates, for valuable services rendered in connection with the preparation of the histological sections.

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BLOODTESTING AS A MEANS OF CONTROLLING BACILLARY WHITE DIARRHŒA IN THE IRISH FREE STATE.

By H. N. SPEARS, M.R.C.V.S.,
Veterinary College of Ireland.

I HOPE in this note to give a brief idea as to the headway that has been made in checking the ravages of bacillary white diarrhœa in this country by systematic bloodtesting. This disease is a serious problem facing the poultry breeder in this and other countries at the present time.

Up to 1924 no case of bacillary white diarrhœa had been recorded in the Irish Free State, but in February of that year there was an outbreak of the disease in a batch of chicks which had been imported as day-olds from England. In 1924 only two outbreaks were noted, but from that year on the disease became more and more widespread until it reached peak point in 1931–32, that is, two years after bloodtesting was begun.

Bloodtesting was commenced in the Veterinary College of Ireland, Dublin, in 1929, and has been continued there ever since. The test employed is the whole-tube test, and it has proved itself a very reliable and simple one. A definite reaction is taken as agglutination in a dilution of 1 in 25 for pullets and hens, while in the case of male birds two dilutions are used—1 in 12.5 and 1 in 25, agglutination in the former being taken as a positive reaction. Boxes, tubes and forms are supplied by the College laboratory, and a small charge is levied to cover expenses. In the case of poultry stations the charges are met by the County Committee of Agriculture of that particular district. I might add that a number of these Government-controlled poultry stations were commenced under the Poultry Stations Scheme, which was instituted in 1927, its purpose being to distribute to selected breeders sittings of eggs from high-grade pedigree poultry. To clear these poultry stations of bacillary white diarrhœa is the first object in the eradication scheme.

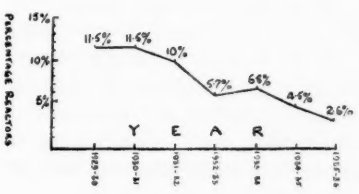
The greatest demand for testing is during the late summer and autumn, namely, July to October, the number easing off in winter and spring.

Several difficulties are encountered in the course of a season's testing. The first is the difficulty of obtaining sufficient serum from some blood samples, although all the instructions to starve the birds for twenty-four hours, to allow an ample supply of water, etc., have apparently been observed. The lack of serum is not nearly so pronounced in the summer months as in the winter. In cold weather placing the samples in an incubator at 37° C. for about two hours usually has the desired effect of helping clotting and providing ample serum. Great trouble, too, is experienced in very warm weather owing to rapid decomposition of the blood while in transit. It has been our practice to instruct that the skin be wiped with some methylated spirits before drawing the blood, but

we have had to abandon it as some used an excess of the spirit, which mingled with the blood when it was being taken. Another difficulty met with is " cloudy serum," but this difficulty is not of frequent occurrence and has been more or less overcome by adding traces of potassium hydroxide to the antigen.

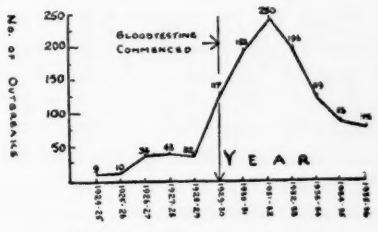
If reactors occur at the first test, a second one is applied a month later. If reactors occur again, the test is repeated at monthly intervals until no reactors are encountered. Reacting birds are killed off and disposed of and the premises are as thoroughly disinfected as possible.

Only 1,318 tests were carried out in the first year, that is, 1929–30; but as poultry breeders troubled with bacillary white diarrhœa saw the usefulness of the test, there was a rapid rise in the number of samples dealt with annually.



GRAPH No. 1.

The above graph shows the reduction in the percentage of reacting birds over the seven years.



GRAPH No. 2.

The above graph demonstrates the gradual and then rapid spread of bacillary white diarrhœa and, finally, the gradual reduction of its incidence. The figures for 1928-29 are not complete owing to the fact that for two months poultry specimens were sent to another laboratory on account of the death of one of the staff.

In 1931–32, the year in which the greatest mortality in chicks due to the disease was experienced, 19,760 tests were carried out as compared with 10,249 in the previous year, that is 1930–31. The average percentage of reactors over these three years was between 10 per cent. and 11 per cent. The following year, 1932–33, 50,400 samples were tested, and of this number only 5.7 per cent. reacted, a reduction on the figures of the previous years of nearly 50 per cent. Then in the following period, 1934–35, the number of tests rose sharply again to 73,900, but of these there was a discouraging rise in the percentage of reactors to 6.8 per cent. The only explanation for this was that a greater number of flocks were tested in which the disease, not being checked in the previous years by the detection of carrier birds by blood testing, had now infected the greater proportion of their flocks. This is borne out by the fact that in 1933–34, that is the year in which there was a rise in the percentage of reactors, the number of flocks with over 25 per cent. reactors rose to 103, as compared with 79 in the previous year. However, notwithstanding these disheartening figures, the number of samples tested rose to

84,115 in the following year, 1934–35, and the number of reactors dropped to 4.5 per cent., a substantial reduction of the corresponding figure of the previous period. In 1935–36 the number of tests dropped slightly to 81,847, but the percentage of reactors also fell appreciably to 2.6 per cent. Thus, through bloodtesting over a period seven years, the number of reacting birds had been reduced from 11.5 per cent. to 2.6 per cent., and although the figures for the present year are not yet complete, each year, dating from April 1st to March 31st of the following year, we have hopes that they will show even a further reduction. Admittedly these figures are not an absolutely true guide to the incidence of bacillary white diarrhœa, as a number of birds which react may be affected with fowl typhoid; but fowl typhoid is such a relatively rare disease in this country that its incidence is not likely to affect these figures to any considerable extent.

From the two graphs it is fairly clear that though bloodtesting over the last seven years has not yet eliminated bacillary white diarrhœa from this country, it certainly has had the effect of largely checking its progress and reducing its incidence. All the Department poultry stations and most of the larger private breeders are now almost free from infection, but the great obstacle in the eradication of the disease are the small private owners, many of whom are harbingers of the disease, and until it is possible to include all these under some scheme of systematic bloodtesting, it is not likely that bacillary white diarrhœa will be completely eliminated in this country.

However, with the introduction of legislation to control the importation of birds and eggs likely to be affected with the disease, together with a more extensive bloodtesting scheme designed to include the small breeders, it is hoped that bacillary white diarrhœa will be completely eradicated from this country in the near future.

A PRELIMINARY REPORT ON THE HELMINTHIC PARASITES OF POULTRY, WILD BIRDS AND SMALL MAMMALS IN THE SOUTH WALES AREA.

By T. WALKER, B.Sc.,

Of the Department of Zoology, University College of Wales, Aberystwyth.

(From the Advisory and Research Department in Agriculture, University College of South Wales and Monmouthshire, Cardiff.)

THE material for this investigation was obtained through the kindness of Mr. E. Ashton, of the Cardiff Market, and Mr. John Williams, taxidermist at the National Museum of Wales, Cardiff. The work was carried out at the laboratory of Mr. E. E. Edwards, M.Sc., advisory zoologist at the University College of South Wales and Monmouthshire, Cardiff.

As far as can be ascertained no previous record of the helminthic parasites of wild birds has been made in South Wales Previous work on the incidence of this

type of parasite in this area is that of N. Bisset on *Syngamus trachea*, Montagu, in crows (*Corvus corone*, Linn.), and *Davainea proglottina*, Davaine, and *Amœbotænia sphenoides*, Railliet, in chickens (*Gallus gallus dom.*) in 1927. Earlier reports for Wales are those of Walton, in 1917 and 1924, from Bangor, and E. A. Lewis, in 1925, 1926 and 1930, from Aberystwyth.

I.—Helminthic Parasites of Poultry.

(*a*) Chicken (*Gallus gallus dom.*, Linn.).—Out of 160 specimens examined, over half were free from infection by some helminthic parasite. The parasites found were :

(1) *Ascaridia perspicillum* (Rudolphi, 1803) was recorded either singly or only in small numbers, from the intestine during the late spring, summer and early autumn months.

(2) *Capillaria longicollis* (Rudolphi, 1819). Two female worms were obtained, embedded in the mucus of the duodenum, during December, 1935.

(3) *Heterakis gallinæ* (Gmelin, 1790) was found to occur regularly in the cæcum throughout the period of the investigation. It was more numerous during the winter and spring months. The largest number obtained from one bird was twenty.

(4) *Davainea proglottina* (Davaine, 1860) was found to cause damage to young poultry. As many as 123 were obtained from the duodenum of one bird.

(*b*) Duck (*Anas boscas dom.*, Linn.).—Eight specimens were examined, three of which were parasitised by *Capillaria anatis* (Schrank, 1790). An immature cestode, *Raillietina sp.*, was found in the intestine of one duck.

(*c*) Grouse (*Lygopus scoticus*, Lath.).—Twenty specimens were examined during August and September, 1936, of which four were parasitised by *Raillietina* (*Raillietina*) *tetragona* (Molin, 1858).

(*d*) Guinea fowl (*Numida meleagris*, Linn.).—Seven birds were examined. *Ascaridia perspicillum* was found in the intestine on four occasions, and *Heterakis gallinæ* in small numbers in the cæcum on three occasions. *Raillietina tetragona* were recorded from one bird.

(*e*) Pheasant (*Phasianus colchicus*, Linn).—Fifty specimens were examined, most of which were parasitised :

(1) *Ascaridia perspicillum* was recorded on three occasions during late March and April.

(2) *Capillaria sp.* One specimen was obtained from the cæcum of one pheasant.

(3) *Heterakis gallinæ* occurred regularly in the cæcum, but was more numerous during the winter and spring months. The largest number obtained from one bird was sixty-three.

(*f*) No parasites were found in the following : Geese (*Anser anser*, Linn.) ; partridge (*Perdix perdix*, Linn.) ; Turkey (*Meleagris gallopavo*, Linn.).

II.—Helminthic Parasites of Wild Birds.

(*a*) Blackbird (*Turdus merula*, Linn.).—One specimen of *Lyperosomum longicauda* was obtained from the gall-bladder.

(*b*) Common crow (*Corvus corone*, Linn.).—Several specimens of *Dilepis undula* (Schrank, 1788) were found in the small intestine. There were large calcareous cysts in the liver of one bird.

(*c*) Long-tailed duck (*Clangula hyemalis*, Linn.).—One bird was received at the National Museum from Isbistern, Orkneys, during October, 1935. Five specimens of a large cestode, *Hymenolepis sp.* were obtained from the intestine.

(*d*) Oyster-catcher (*Hæmatopus ostralegus*, Linn).—Numerous parasites were obtained from the small intestine of a bird recently examined, but have not yet been fully identified. *Haploparaxis crassirostris* (Krabbe, 1869); *Hymenolepis sp.*; *Psilostomum brevicolle*, Creplin.

(*e*) Redshank (*Tringa totanus*, Linn.).—A large number of echinostomes, *Himasthla elongata*, Mehlis, were found in the intestines of three birds.

(*f*) Southern dunlin (*Calidris alpina*, Linn.).—Numerous parasites were found in the intestine of two birds: *Hymenolepis sp.*; *Ophryocotyle proteus* (Friis, 1869); *Himasthla leptosoma*, Creplin.

(*g*) Sparrow hawk (*Accipiter nisus*, Linn.).—Four specimens of *Porrocæcum depressum* (Zeder, 1800) were found in the intestine and body cavity.

(*h*) Starling (*Sturnus vulgaris*, Linn.).—One young bird was heavily parasitised by: *Porroccæum ensecaudatum* (Zeder, 1800) in the intestine; *Syngamus trachea* (Montagu, 1811) in the trachea; *Dilepis undula* (Schrank, 1788) in the intestine; *Harmostomum sp.* in the intestine. Nicoll does not record *Harmostomum* as occurring in the starling.

(*i*) *Swan* (*Cygnus cygnus*, Linn.).—One specimen of *Strigea tarda* (Steenstrup, 1842) was found in the small intestine of a young bird.

(*j*) Woodpecker (*Gecinus viridis*, Linn.).—Four fragments of a cestode, *Raillietina sp.*, were found in the small intestine.

(*k*) The following birds were examined during the session 1935–6, but no helminthic parasites were found: Common snipe (*Gallingo gallingo*, Linn.); dipper, or ringed ouzel (*Cinctus cinctus*, Linn.); golden plover (*Charadrius pluvialis*, Linn.); grey-lag goose (*Anser anser*, Linn.); house sparrow (*Passer domesticus*, Linn.); knot (*Calidris canutus*, Linn.); mallard duck (*Anas boscas*, Linn.); magpie (*Pica pica*, Linn.); raven (*Corvus corax*, Linn.); rook (*Corvus frugilegus*, Linn.); wood pigeon (*Columba palumbus*, Linn.).

III.—Helminthic Parasites of Small Mammals.

(*a*) House mouse (*Mus musculus*, Linn.).—Two specimens of *Syphacia obvelata* (Rudolphi, 1802) were found in the cæcum.

(*b*) Mole (*Talpa europæa*, Linn.).—Three moles were obtained during the latter part of January, 1936. A double infection of *Ityogonimus talpæ* (Goeze,

1782), and *It. lorum* (Dujardin, 1845) was found on two occasions, while only the latter species was found in the third. As many as forty-two specimens of *It. talpæ* and eight of *It. lorum* were recorded from one mole.

(*c*) Brown rat (*Mus norvegicus*, Erxl.).—One specimen of *Hymenolepis nana* (v. *Siebold*, 1932) was obtained from the small intestine.

(*d*) No helminthic parasites were obtained from: Hedgehog (*Erinaceus europæus*, Linn.); field mouse (*Micromys minutus*, Pall.); field vole (*Microtus agrestis*, Linn.).

During the session 1935–36 amphibia were examined for parasites of the urinary bladder. Although no specimens of *Gorgoderina vitelliloba* (Olss, 1876) were found, there were occasional infestations of *Polystomum integerrimum* (Froel). Six infestations totalling seventeen specimens occurred in 350 frogs. Seven worms were found in one frog and six in another. Although the incidence of *P. integerrimum* was not great, the infestations were heavy.

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Abstracts of Current Literature

Control of Poultry Diseases. Abstract from the Memorandum describing action of Ministry under the Diseases of Animals Act, 1935.

THE Memorandum states that in view of the prevalence among poultry stocks of certain diseases, such as fowl pox, bacillary white diarrhœa, fowl typhoid, tuberculosis, and of coccidiosis and the other parasitic infestations, and also to a less extent of fowl cholera and contagious bronchitis (laryngo-tracheitis), any attempt at compulsory measures of the kind above referred to would unduly interfere with the normal business of poultry keepers. It is not therefore proposed

to make such diseases compulsorily notifiable, and the Ministry is informed that the industry does not desire such action. These diseases will consequently be dealt with as at present, by the issue of Advisory Leaflets* and through the work of existing educational institutions, supplemented where necessary by inquiries and advice by the Veterinary Inspectors of the Ministry.

Fowl pox, fowl typhoid, bacillary white diarrhœa.—As a result of research carried out in recent years at the Ministry's Laboratory at Weybridge and elsewhere, considerable progress has been made in the methods of eliminating certain of the most prevalent of the contagious diseases of poultry, and adequate measures for the control of these diseases are available to poultry owners. For example, vaccines are available for fowl pox and fowl typhoid, and a reliable blood test has been established for fowl typhoid and for bacillary white diarrhœa.

Representations have been made from certain quarters urging that fowl typhoid should be made compulsorily notifiable, but this disease does not lend itself readily to legislative action. The symptoms of fowl typhoid are not diagnostic, and it would be difficult to enforce notification. It is most frequently met with on insanitary farms and is not likely to gain a hold on premises where hygienic conditions are reasonably satisfactory. It is of interest that it has not been found possible to induce this disease experimentally at the Ministry's laboratory.

Avian tuberculosis.—Measures of control are also available for this disease, including the use of the tuberculin test for diagnosis.

Fowl cholera.—Any cases of fowl cholera which come to the knowledge of the Ministry are notified to the Veterinary Investigation Officers of the respective provincial centres, who advise the owner as to the best methods to pursue to limit his losses and prevent the spread of infection.

Contagious bronchitis (*laryngo-tracheitis*).—The Ministry has recently considered the question of dealing by administrative Order requiring notification, etc., with contagious bronchitis of poultry (infectious laryngo-tracheitis). A number of independent and widely scattered outbreaks of this disease has been discovered in England since the beginning of 1935. Mortality varies considerably in individual cases, but on the whole is not high. Control of the disease is rendered more difficult by the fact that recovered birds act as carriers. At present it is impossible to distinguish in the initial stages between the two types of the disease, one of a virulent character with comparatively heavy mortality, and the other a mild form with a low death-rate. Further research work is needed on this disease. The Ministry's Advisory Leaflet No. 250 gives the owner advice as to the steps which should be taken and this leaflet will be widely distributed.

Legislative Action—New Orders.

Having regard to the conditions under which the poultry industry is carried on at the present time in Great Britain, legislative action is directed to three main purposes, namely :

* These can always be obtained from H.M. Stationery Office, or upon application direct to the Ministry of Agriculture and Fisheries, Whitehall Place, London, S.W. 1.

(i) Provision for dealing with the serious exotic diseases which if allowed to spread might have disastrous consequences to the industry. The only diseases at present coming within this category are those included in the term "fowl pest" (which includes fowl plague and Newcastle disease). The mortality in affected flocks sometimes reaches 100 per cent., but the disease does not exist at present in Great Britain. The disease is being made compulsorily notifiable by the Fowl Pest Order of 1936, described below.

(ii) The control of the importation of live poultry, and of eggs intended for hatching, to prevent the introduction of fowl pest and also of contagious bronchitis (laryngo-tracheitis) and the virulent forms of fowl cholera. An Order with this object in view has been made entitled the "Poultry and Hatching Eggs (Importation) Order of 1936, described in detail below. In framing this Order the opportunity has been taken of including in the prescribed veterinary certificate to accompany imported poultry and hatching eggs provisions to ensure their freedom from the more commonly existing diseases as well as from fowl pest. As fowl pest does not exist in Ireland, the Channel Islands or the Isle of Man, the provisions of the Order do not apply to poultry or hatching eggs brought from those countries.

(iii) The prevention, so far as may be practicable without unduly interfering with the poultry trade, of the spread of infection at markets and through the agency of poultry receptacles. It is not considered a practicable proposition effectively to prohibit the exposure of diseased poultry at markets partly on account of the administrative difficulties involved and partly because of the objection of the poultry industry as a whole to official interference in the case of the commonly existing poultry diseases. Action is therefore being limited to the compulsory cleansing and disinfection after each occasion of use of market pens and receptacles used for poultry. These requirements are imposed by the Poultry Markets and Receptacles (Disinfection) Order of 1936.

The three Orders mentioned, the provisions of which are summarised below, are the first statutory regulations to be imposed in Great Britain dealing with poultry diseases, and they are, of course, subject to alteration or addition as experience may prove desirable.

The Fowl Pest Order of 1936.

This Order will come into operation on January 11th, 1937, and applies to any form of fowl pest (including fowl plague and Newcastle disease).

(*a*) *Compulsory Notification* (Article 1).—The Order requires every person having in his possession or under his charge any poultry or the carcase of any poultry affected with or suspected of fowl pest to send a written notification immediately to the Director, Laboratory of the Ministry of Agriculture, New Haw, Weybridge, Surrey, giving the address of the premises where the poultry or carcase is, the name of the owner or person in charge, the approximate number of live poultry on the premises, and the approximate number of deaths (if any) during the preceding twenty-eight days. *The owner is also required by the Order to despatch*

to the above-named Laboratory for examination the carcase of a diseased or suspected bird, securely packed in a box with sufficient absorbent material to prevent leakage and labelled with the name and address of the sender and with the words " Suspected Fowl Pest." The box should not be sent by post, and if sent by rail must go by passenger train. No fee will be charged for the examination.

Veterinary surgeons observing any suspected case must also notify the Director of the Laboratory in writing and call the owner's attention to his obligation to forward the carcase to the Laboratory. Any veterinary inspector who observes a suspected case is required to notify the Laboratory and also to forward the carcase to the Laboratory. The diagnosis may occupy from five to ten days.

(*b*) *Precautionary restrictions pending diagnosis* (Article 2).—The owner will be notified as soon as possible by the Ministry as to whether or not the diagnosis confirms the presence of fowl pest. Meantime the owner is required by the Order :

(i) To prevent the access of other poultry, or of any person except the attendant, to that part of the premises where any suspected bird or carcase is or was kept ; and

(ii) To detain all other poultry on the premises except the dressed carcases of healthy birds.

(*c*) *Diagnosis at Ministry's Laboratory* (Article 3).—The diagnosis will be determined at the Ministry's Veterinary Laboratory in all cases.

(*d*) *Declaration of Infected Place* (*Form A*) *and application of Rules* (Article 4). —On confirmation of disease the Ministry will notify the Local Authority, who are required to cause a notice (Form A) as specified in the Schedule to the Order forthwith to be served on the occupier of the premises declaring an infected place and applying thereto certain rules for the prevention of the spread of infection. Form A can only be withdrawn by the Ministry.

(*e*) *Compulsory Slaughter* (Articles 5 and 6).—Provision is made for the compulsory slaughter by and at the discretion of the Ministry of all affected stocks and of any stocks directly exposed to infection, with compensation for stock other than diseased stock so slaughtered to the extent of their value immediately before slaughter.

(*f*) *Cleansing and Disinfection* (Article 7).—Provision is made for such cleansing and disinfection of premises on which disease exists or is suspected as the Ministry's inspector considers necessary.

(*g*) *Restrictions on poultry exposed to infection* (Article 8).—This Article requires an inspector to serve a notice of detention (Form B) in respect of any other poultry stocks on premises which appear to have been exposed to infection. These notices prohibit the movement of poultry into or out of the premises except by licence, and should remain in operation for a period of fourteen days' duration from the last known date of possible contact with infection.

Symptoms of Fowl Pest.

The term " fowl pest " includes the diseases known as fowl plague and Newcastle disease. These are highly dangerous virus diseases which may cause heavy and rapid mortality.

Fowl Plague may affect domestic fowls, turkeys, geese, ducks and guinea fowls. The period of incubation varies from two to seven days and birds affected with the acute form are frequently found dead without exhibiting previous symptoms. The affected birds refuse food, are generally dejected, listless, feathers are ruffled, and in some cases there is a discharge from the eyes and nostrils.

Newcastle disease naturally affects the common fowl and may be transmitted to pigeons, ducks and geese. The period of incubation is from five to seven days. Affected birds refuse food, but drink frequently, and stand in a crouching position. They assume a sleepy appearance with eyes half or fully closed, and wings and legs often become paralysed. The most characteristic symptom is seen in the respiratory system. There is a long gasping inhalation through the half-open mouth accompanied by gurgling and a frothy exudate from the point of the beak.

Poultry and Hatching Eggs (Importation) Order of 1936.

This Order, which will come into operation on February 15th, 1937, controls the importation of (i) domestic fowls, turkeys, geese and ducks; (ii) day-old chicks of domestic fowls; and (iii) the eggs of domestic fowls intended for hatching. The Order:

(*a*) Prohibits the landing in Great Britain of *live poultry of the above species (other than day-old chicks)* from any other country except Northern Ireland, the Irish Free State, the Channel Islands and the Isle of Man, with the proviso that:

(i) Consignments may be landed with a licence previously obtained from the Ministry and subject to such conditions as may be prescribed.

(ii) Small consignments of poultry, other than geese, not exceeding twenty-one birds (estimated to include about three breeding pens) may be landed if accompanied by a certificate signed by a veterinary officer of the Government of the country of origin to the effect that there has been no outbreak of fowl pest within a radius of fifteen miles of any premises on which the poultry have been kept during the previous six months; that, in the case of domestic fowls and turkeys, they were tested for bacillary white diarrhœa, fowl typhoid and tuberculosis within the preceding month and found to be free from those diseases; and that the poultry to be imported, and the flocks from which they were brought, were also free from fowl cholera, contagious bronchitis, fowl pox and fowl paralysis.

(*b*) Prohibits the landing in Great Britain from any other country except Northern Ireland, the Irish Free State, the Channel Islands and the Isle of Man of *day-old chicks of domestic fowls, or the eggs of domestic fowls declared on the Customs entry to be intended for hatching*, or the use of such eggs for hatching, unless the chicks or eggs are accompanied by a certificate signed by a veterinary officer of the Government of the country of origin to the effect that during the period of six months preceding the proposed date of shipment (*a*) the fowls from which the eggs were produced and (*b*) the poultry on the premises on which the chicks were hatched, have been free from fowl pest and have not been kept on nor within fifteen miles from any premises where fowl pest then existed or had previously existed within the said period of six months; that the fowls from which the chicks

and/or eggs were produced had, within the preceding six months, been tested and found free from bacillary white diarrhœa and fowl typhoid, and had not subsequently been in contact with untested birds or with reactors; and that the flocks from which the chicks and/or eggs were produced were also free from fowl cholera, contagious bronchitis, tuberculosis, fowl pox or fowl paralysis.

(*c*) Prohibits the transhipment at a port in Great Britain of poultry brought from any country except Northern Ireland, the Irish Free State, the Channel Islands and the Isle of Man.

Poultry Markets and Receptacles (Disinfection) Order of 1936.

This Order will come into operation on January 11th, 1937, and will require the cleansing and disinfection in the prescribed manner of:

(*a*) Every pen or other enclosure and every bench, stand or other fitting used for poultry in any market, fairground, saleyard, highway or other premises where live poultry are habitually exposed for sale as soon as practicable after being used for that purpose and before being again so used; and

(*b*) Every receptacle used for the conveyance of poultry to any place in Great Britain or for the exposure for sale of poultry, as soon as practicable after each load of poultry has been removed, and before being again used for poultry. Similar cleansing and disinfection is required of receptacles (after the poultry have been discharged) which are to be returned empty or sent by railway, hired road vehicle, vessel or aircraft, before they are so despatched.

The prescribed process consists of a thorough and effectual cleansing followed by a thorough washing or spraying with a 4 per cent. solution of washing soda, this being free from the risk of tainting. The sweepings of the pen, droppings, litter, etc., are required to be effectually removed from contact with poultry.

Ministry of Agriculture and Fisheries,
Whitehall Place, London, S.W.1.

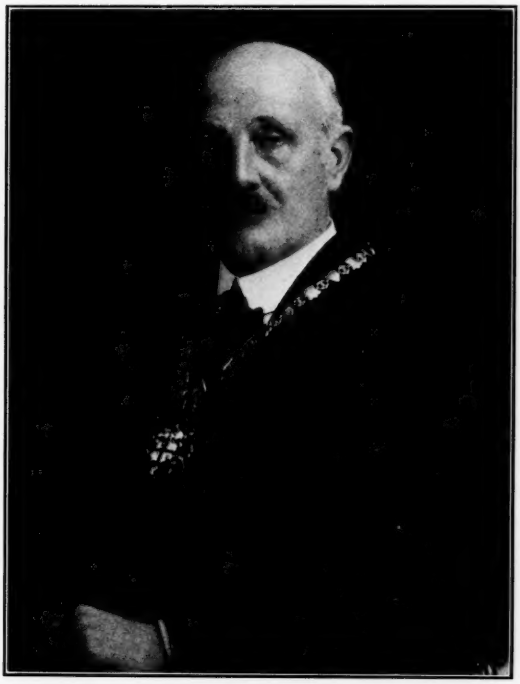
9*th December*, 1936.

Correspondence

INFECTIOUS BROWN MOUTH OR DRY DISTEMPER.

To the Editor of THE VETERINARY JOURNAL.

SIR,—I must congratulate Major Pugh on his article appearing in the November issue, in which he describes a condition which he terms "Infectious Brown Mouth," or "Dry Distemper." His notes will be of especial interest to veterinary surgeons whose work lies largely among greyhounds, for the condition he describes has been for some time recognised by them, though not under those names. I, personally, have seen the condition in greyhounds who have been reported as having already had distemper, this history being supported by the evidence of pitted teeth; but I have also seen it in greyhounds who bear no record of having suffered from distemper.



The late Mr. HENRY SUMNER, M.R.C.V.S.

President of the Royal College of Veterinary Surgeons, 1922–1923, *and Member of the Council from* 1906 *to* 1930.

With greyhounds I have found that the temperatures are somewhat higher in this condition than one would expect in distemper cases, and following thorough cleaning the teeth will become coated again after as short a period as two hours.

Diarrhœa appears to be very common, especially mixed with blood and mucus, and jaundice is a frequent symptom. The marked wasting of the body is particularly noticeable in greyhounds, as there is so little body fat present. Frequently the first symptom reported is that the dog has had an attack of hysteria, and the other symptoms follow this attack in due course. I have observed the condition most commonly amongst greyhounds recently imported from Ireland. One epidemic that interested me occurred in a dachshund kennel. Several dogs who had been inoculated against distemper were affected and showed symptoms of the condition described, but these, without exception, recovered. On the other hand, all dogs who had not been immunised against distemper and were victims of the epidemic died. In this case the precipitating cause may have been true distemper. In fact, the report from first inoculation proved this to be so. In post-mortems I have often found a gastritis present, but in most cases resolution was taking place.

Although the names " dry distemper " or " infectious brown mouth " are new to me, I have for a long time recognised the condition, and have differentiated it from true distemper and the complications following true distemper. It would be very interesting, and certainly helpful, to hear from other members who are familiar with the condition. I am particularly anxious to hear Major Dalling's views when he records the results of his experiments in the outbreaks described by Major Pugh.—I am, Sir, yours faithfully.

S. H. Hodgman.

Obituary

HENRY SUMNER (Senr.), M.R.C.V.S.

By the death of Henry Sumner, practitioners in Liverpool, and indeed of every part of the Lancashire area, have lost not only a very able consultant, but a very dear friend ; and many students of the Liverpool school who owe the start of the practical side of their veterinary life to his careful teaching will regret his passing. As one of the original founders of the idea of a veterinary school attached to the University of Liverpool, it was largely owing to his influence that facilities were made for the transference of the new Veterinary College of Edinburgh and its incorporation into its present site ; he himself becoming the first lecturer of veterinary medicine and surgery. It was somewhat of an innovation for outside practitioners to form the greater part of the teaching staff of a veterinary school in Great Britain, and if every teacher had possessed the tact and ability of Henry Sumner this system in so far as Liverpool is concerned would probably still be in existence to-day. It has the advantage of teaching the students how to handle clients.

From student days in the London College, Henry Sumner proved his worth by taking not only a large proportion of the class prizes, but also the first Fitzwygram in the year 1882. After qualifying, his practice in Liverpool, together with its large number of shoeing forges—so necessary in those days to the big contracts which were undertaken by veterinary surgeons in commercial districts—became one of the biggest in the northern counties ; but he found time to devote his energies not only to the Council, on which he served for some twenty-four years, but to undertake the duties of President in 1922 and 1923, and it was with very great regret that his brother

members heard his resolution to resign in 1930. The most earnest wish of his life was to put his profession on a University footing, and his breadth of mind and kindness of heart in dealing with his fellow men, whether in or out of the profession, was proverbial. It was a standing rule, which came naturally to him, that if he could not say good of any man he should never say aught that was ill. Such men are hard to replace and his loss will be deeply felt throughout his large circle of friends and admirers.

SIR JOHN BLAND-SUTTON, Bart., M.D., D.Sc., F.R.C.S.

ALTHOUGH perhaps not so well known in the veterinary world as in that of human medicine and surgery, Sir John Bland-Sutton was in more than one way a very great friend of our profession. His interest in animals was proverbial, and his work as Prosector of the Zoological Gardens added much to our knowledge of Comparative Anatomy and Pathology, particularly that of the comparative aspect of tumours and abnormalities. A great traveller—we have evidence of this in his writings, which were not confined merely to purely professional works—his "Man and Beast in Eastern Ethiopia," and "Men and Creatures in Uganda," are fascinating reading for veterinary surgeons. At one time, prior to the appointment of Sir John M'Fadyean, he was lecturer on pathology in the Royal Veterinary College, where he made many friends, and where he was always accessible to his students, and only too delighted to get an interested circle around him. In the world of human surgery he made a great name, particularly for his boldness in abdominal work, and to the Middlesex Hospital he became one of its greatest benefactors, founding the Bland-Sutton Pathological Institute in 1914. His honours included Hunterian Professor of Comparative Anatomy and Surgery, Erasmus Wilson Lecturer, Bradshaw Lecturer and Hunterian Orator; and in the years 1923, 1924, 1925 he was elected President of the Royal College of Surgeons. Sir John had many friends in the veterinary profession, and when he had time to look in at our gatherings was always a welcome visitor.

MRS. CARLO F. C. CLARKE.

THE women students and graduates of the London College will hear with regret of the death of Mrs. Carlo F. C. Clarke, whom many of them will remember as a lady who was a very great help and friend to the women students, especially at the time of the initiation of their first Common Room in the old buildings. A lady of great sporting instincts and one not only born to command respect, she showed a practical appreciation of the difficulties under which both staff and students were then labouring, and she has been frequently spoken of as their "fairy godmother." Always ready to give kindly advice and to devote her time unselfishly whenever asked, it may be said that it was owing to her influence that the Governors granted the comfortable furniture which is in the Women's Common Room. When suitable quarters were allotted to the women students by the Principal, Sir Frederick Hobday, in a portion of what was originally Sir John M'Fadyean's house, the question of "making bricks without straw," in the shape of finding money for the necessary furniture, came up, and it was largely owing to the energetic efforts of Mrs. Carlo Clarke amongst her friends that the sum of £90 was raised and that furniture to this amount was purchased. Again, on the occasion of a visit of the Governors to inspect the women's quarters, by the tactful intervention of Mrs. Carlo Clarke the payment of the furniture (which was sufficiently substantial to be stated as suitable for the Women's Common Room in the new buildings when completed) was agreed to be paid for from

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the College Funds, thus leaving this money to be utilised for providing numerous other comforts which were so badly needed.

Mrs. Carlo Clarke was well known as a bold rider in the hunting field; and in the canine world not only won many prizes with her greyhounds, bulldogs and Pekinese, but was a much respected judge of various breeds and at one time accepted the Chairmanship of the Ladies' Kennel Association. Voluntarily on several occasions she demonstrated her knowledge of the breeds of dogs and their uses to the students of the College. Her presence will be much missed in numerous sporting circles. Amongst those who attended, as a token of respect, at the obsequies, the Royal Veterinary College was represented by the Principal, Sir Frederick Hobday, and Miss Delavoie, M.R.C.V.S., a former President of the Women's branch of the College Students' Union.

Preparations and Appliances

In our November issue there appeared a notice of "Sol-vit-ax" Cod Liver Oil, a product of the British Cod Liver Oil Producers (Hull), Ltd. We regret, however, that some small inaccuracies occurred, and we take this opportunity of rectifying them. It was stated that 81 biological tests had been made since January, 1935, but this is out of date and refers to a period some considerable time ago. The laboratories of the British Cod Liver Oil Producers (Hull), Ltd., carry out over 200 tests a year, apart altogether from those they are continuing to get from outside laboratories. The figures dealing with the costs of the biological laboratory and of the refinery are also appreciably below the actual costs.

Personal

LUNG SICKNESS CONTROL IN SOUTH-WEST AFRICA.

According to the *Star*, Johannesburg, the alleged introduction of lung sickness from the Okavango district of South-West Africa into the Bechuanaland Protectorate was the primary reason for the visit of Mr. John Hobday, B.Sc., M.R.C.V.S., Chief Veterinary Officer to the Bechuanaland Administration, to Windhoek, early in October, the visit being made by aeroplane. It was believed that lung sickness had been introduced from the northern part of South-West Africa, and the two administrations are now to co-ordinate their efforts to prevent this spreading. By mutual agreement no movement of stock is allowed outside the police zone in South-West Africa. Another matter satisfactorily discussed was the possibility of the South-West African Administration disposing of pedigree karakul stock to the Bechuanaland Administration; also a scheme for the export of livestock from Bechuanaland on the hoof as beef from Walvis Bay. The route which Mr. Hobday took in his aeroplane across the Kalahari, between Ganzi and Windhoek, had never been flown before (and had proved on this occasion to be a very rough passage), the total distance being 300 miles. It was so hot that he literally "stripped to the skin," his hat and shoes, on arrival at Mafeking, being his only emblems of civilisation!

[If any of his fellow students who knew him at the London College had witnessed his arrival, this "adaptation of circumstances" would have occasioned no surprise!!—Ed.]

PRESENTATION OF PORTRAIT TO PROFESSOR SIR FREDERICK HOBDAY.

SOME months ago an announcement was made in our columns that it was the intention to present Sir Frederick Hobday, the Principal and Dean of the Royal Veterinary College, with his portrait in oils—the artist being Mr. John Hassall. The portrait has now been completed and will be presented to Sir Frederick by the Duke and Duchess of Portland, on behalf of the subscribers, at the Connaught Rooms, Great Queen Street, London, W.C., at 3.30 p.m., on Thursday, February 18th. It is hoped that as many old students and friends as possible will be there to support His Grace and the Duchess, and to do honour to the occasion.

Publishers' Notices

All communications should be addressed to 7 & 8, Henrietta Street, Covent Garden, London, W.C. 2. Telephone: Temple Bar 8568. Telegrams: "Baillière Phone, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

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